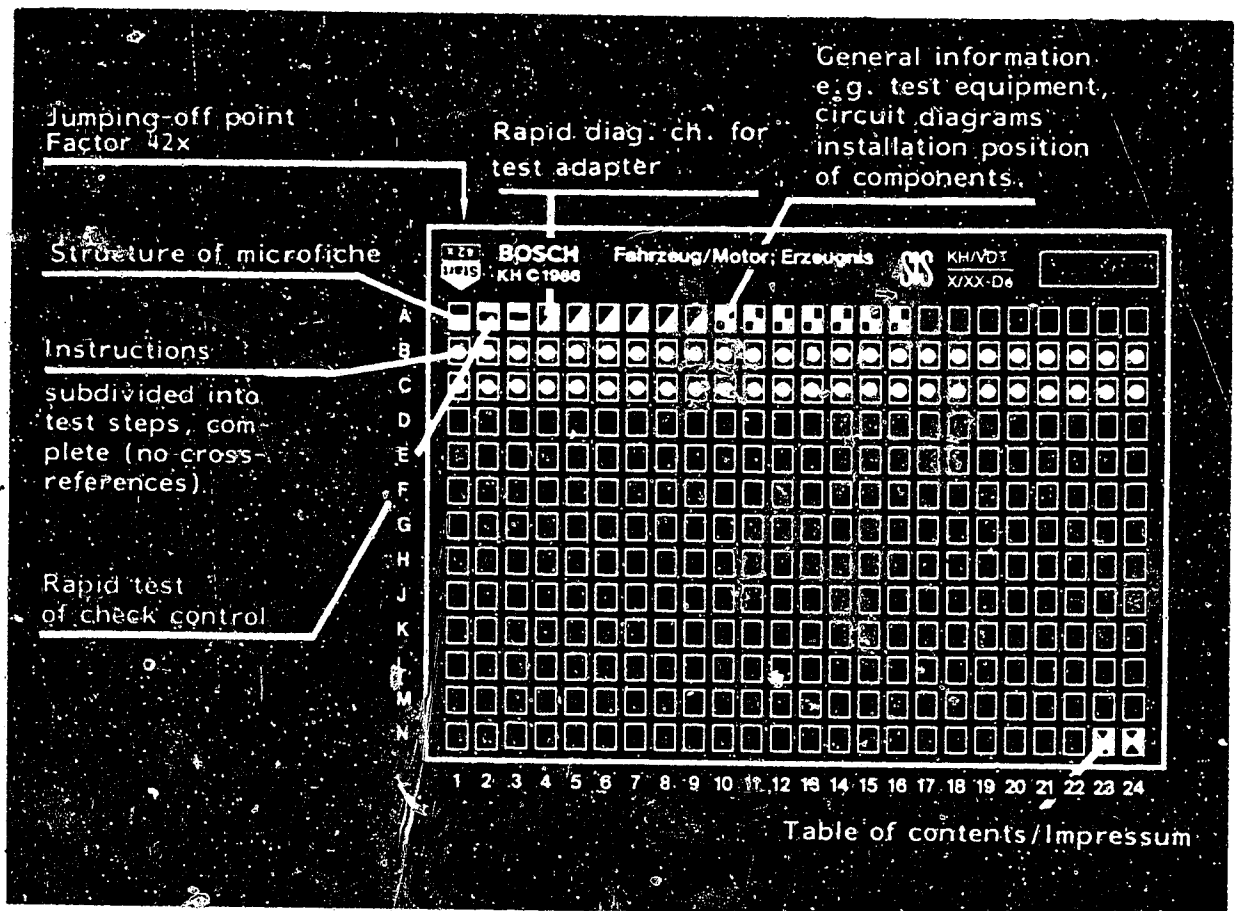


# Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

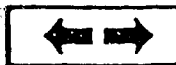
<b>E16</b>	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End

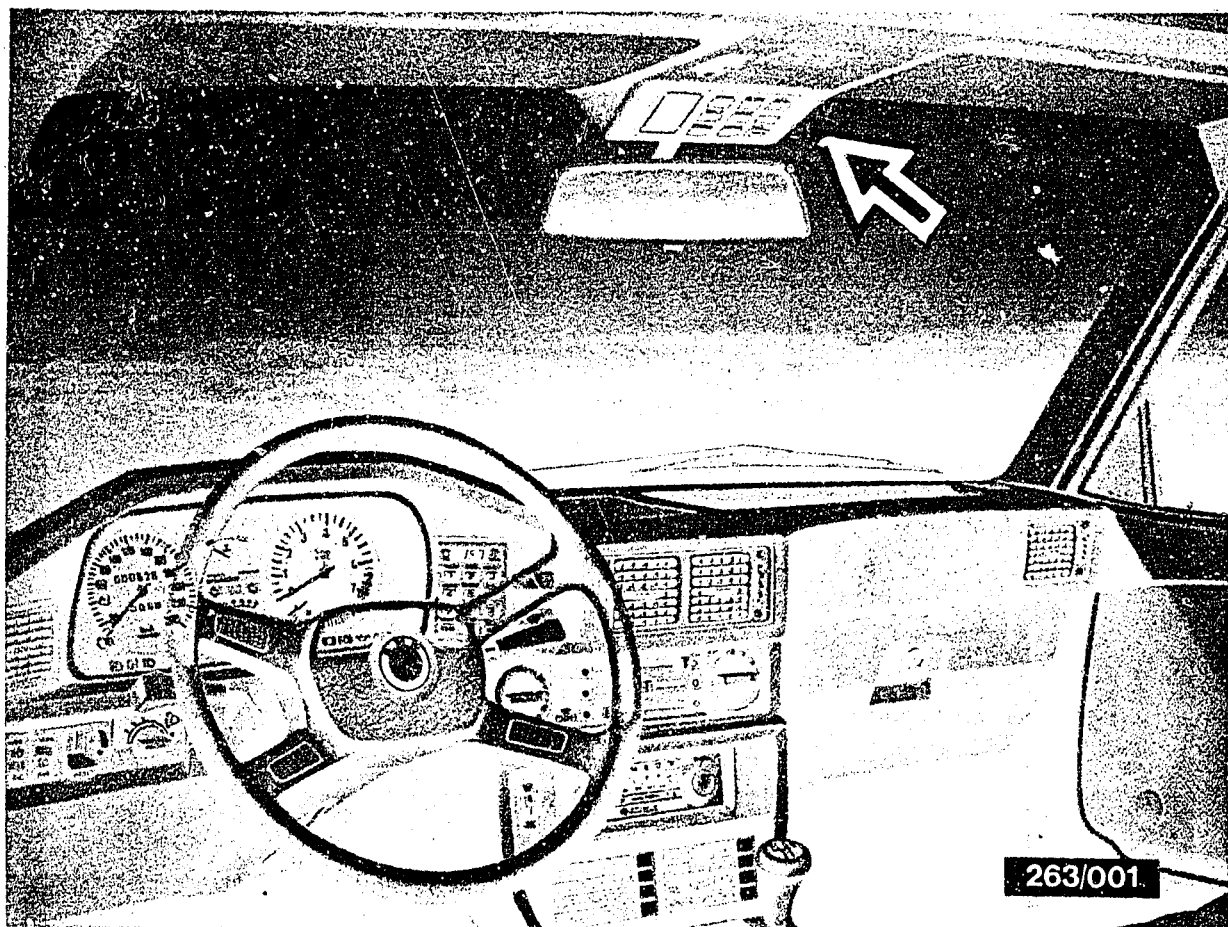


One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

**C6**

<b>A1</b>	Trouble-shooting program	
-----------	--------------------------	--



### 1. Rapid test of check control display unit

The display unit is located above the rear-view mirror (arrow) and is held in position by clips.

If, in the event of a fault, it is not possible to determine with certainty whether the defect is in the display unit or in the peripherals, such as wiring harness or sensors, replace the display unit with a new unit. If the fault is then still indicated, connect adapter KDVM 7601 to the wiring-harness plug and test in accordance with the test chart.

If the fault is no longer indicated, the display unit is defective.

## 2. Rapid diagnosis chart for active check control unit

The following rapid diagnosis chart makes it possible for the experienced specialist to rapidly check the system's active check control unit using the test adapter KDVM 7601. On the peripherals of the active check control unit, leads are tested for continuity, going from the display unit plug (pin ..) to the components of the system or sensors or bulbs. Testing is performed with an ohmmeter or voltmeter, the symbol for which ( $\Omega$ , V) is given at the start of each row in the test instructions. Connect plugs accordingly on test adapter and tester.

The contents of this chart are limited to the following information:

- Switch position on adapter KDVM 7601
- Operation in vehicle
- Test instructions and test specifications
- Reference to coordinates of the appropriate detailed trouble-shooting program

If detailed information and instructions are required for trouble-shooting, always proceed with the trouble-shooting program starting at Coordinate B1.



# Rapid diagnosis chart for peripherals of active check control unit with test adapter KDVM 7601

**Preconditions for testing:** Battery charged, electrolyte density at least 1.24 g/cm<sup>3</sup>

Disconnect display unit from vehicle wiring harness. Connect adapter KDVM 7601 to vehicle wiring harness and connect black sockets to vehicle ground.

## Test sequence

1. Program switch position	2. Operation in vehicle					
	Ignition lock position "R"					
	Ignition lock position "15"					
	Test jacks on test adapter					
				Test instructions	Reading/test specifications	Coordinates
0				Off	---	----
1	●		V	Pin 1 to ignition lock term. "R"	greater than 11.5 V	B 5
2		●		Pin 2 to central indicator lamp; to do this, connect jacks of voltmeter together on test adapter. <u>Important:</u> Before switching to program-selector-switch position 3, the shorting link at the sockets of the voltmeter at the test adapter must be removed, as otherwise the test adapter will be destroyed.	central indicator lights up	B 7
3		●	V	Pin 4 to ignition lock and light switch term. 15	greater than 11.5 V	B 9
4			Ω	(only on export vehicles) pin 5 to O <sub>2</sub> sensor	greater than 20 kΩ	B 11
5			Ω	(only on export vehicles) pin 6 to air bag term. +	greater than 11.5 V	B 13
6			Ω	(only on export vehicles) pin 7 to air bag term. -	less than 20 Ω	B 15
7			Ω	(only on export vehicles) pin 8 to seat belt buckle (Fasten Seat Belts)	greater than 20 Ω	B 17

**A4**

Rapid diagnosis chart

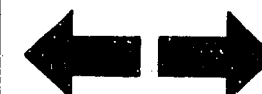
BMW



**A5**

Rapid diagnosis chart

BMW





# Rapid diagnosis chart for peripherals of active check control unit with test adapter KDVM 7601 (continued)

Preconditions for testing: Battery charged, electrolyte density at least 1.24 g/cm<sup>3</sup>

Disconnect display unit from vehicle wiring harness. Connect adapter KDVM 7601 to vehicle wiring harness and connect black sockets to vehicle ground.

## Test sequence

1. Program switch position	2. Operation in vehicle					
	Ignition lock position "R"					
	Side-marker lamp on					
	Test jacks on test adapter					
				Test instructions	Reading/test specifications	Coordinates
8			Ω	Pin 9 to vehicle ground if fault	less than 20 Ω greater than 20 Ω	B 19
9	●	●	V	Pin 11 to light switch term. 58 R and 58 S and bulb monitoring unit term. 58 R	greater than 11.5 V	B 21
10	●	●	V	Pin 12 to light switch and bulb monitoring unit term. 58 L in each case	greater than 11.5 V	B 23
11		●	Ω	Pin 13 to bulb monitoring unit term. 58 K1 including left tail bulb if fault	less than 20 Ω greater than 20 Ω	C 1
12			V	Pin 15 to ignition lock term. 30 and light switch term. 3	greater than 11.5 V	C 3
13			Ω	Pin 16 to oil-level sensor, if static oil level OK if fault	less than 20 Ω greater than 20 Ω	C 5
14			Ω	Pin 17 to washer-fluid sensor, if washer-fluid level OK if fault	less than 20 Ω greater than 20 Ω	C 7

**A6**

Rapid diagnosis chart

BMW



**A7**

Rapid diagnosis chart

BMW



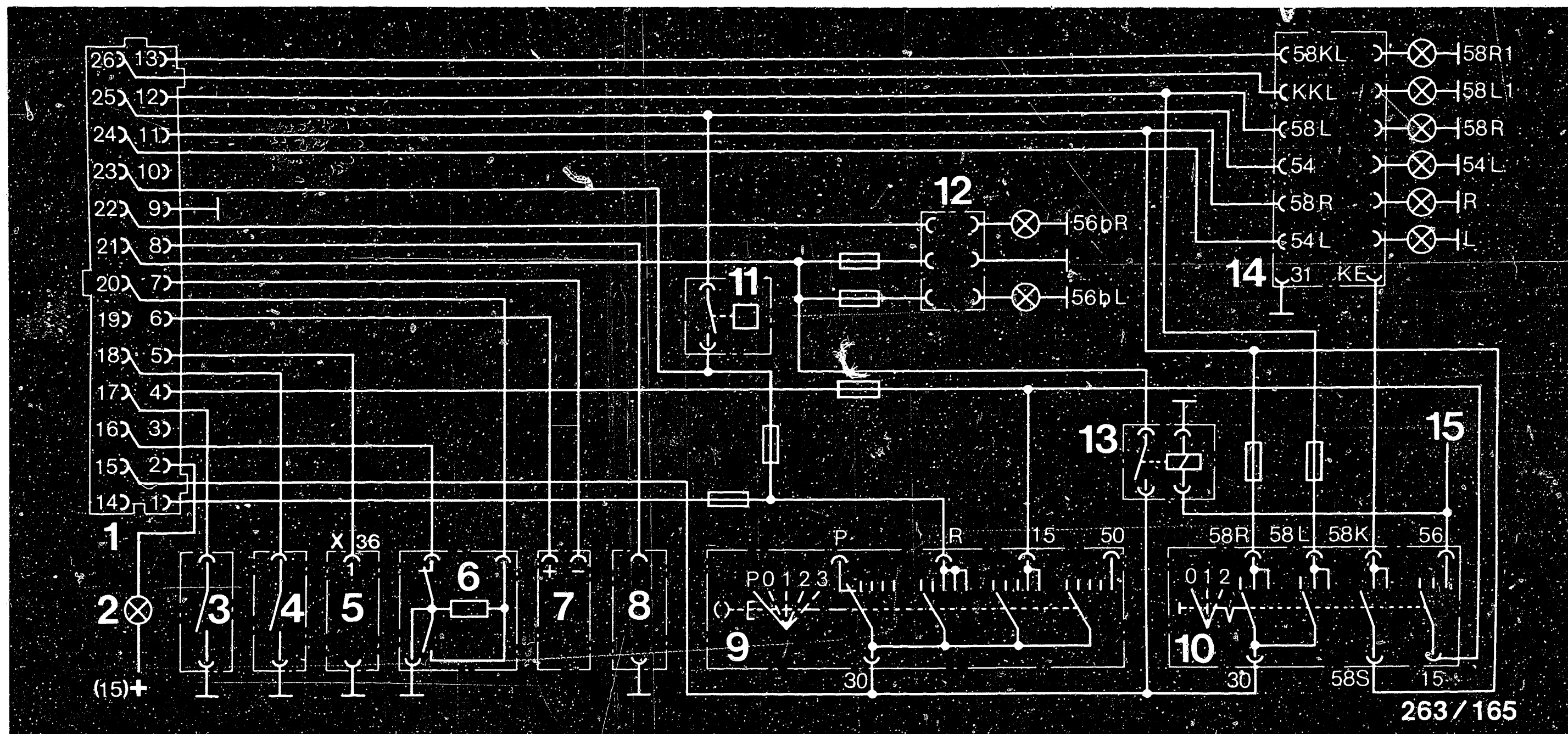
### Rapid diagnosis chart for peripherals of active check control unit with test adapter KDVM 7601 (continued)

Preconditions for testing: Battery charged, electrolyte density at least 1.24 g/cm<sup>3</sup>

Disconnect display unit from vehicle wiring harness. Connect adapter KDVM 7601 to vehicle wiring harness and connect black sockets to vehicle ground.

### Test sequence

1. Program switch position	2. Operation in vehicle					Test instructions	Reading/test specifications	Coordinates
	Ignition lock position "R"	Ignition lock position "15"	Brake pedal depressed	Side-marker lamp on	Lower beam on			
15						$\Omega$ Pin 18 to coolant sensor, if coolant OK if fault	less than 20 $\Omega$ greater than 20 $\Omega$	C 9
16						$\Omega$ Pin 20 to oil-level sensor, if dynamic oil level OK Dynamic oil level not OK If open circuit in lead	1 k $\Omega$ less than 50 $\Omega$ / greater than 5 k $\Omega$	C 11
17	●			●		V Pin 21 to bulb monitoring unit, lower beam and upper-beam relay	greater than 11.5 V	C 13
18	●			●		$\Omega$ Pin 22 to bulb monitoring unit, lower beam term. K) Both bulbs OK/failure of one bulb	less than 20 $\Omega$ greater than 20 $\Omega$	C 15
19	●					V Pin 23 to stop-lamp switch and ignition lock term. R	greater than 11.5 V	C 17
20	●	●				$\Omega$ Pin 24 to bulb monitoring unit term. 54 L Both stop-lamp bulbs OK / failure of one bulb	less than 20 $\Omega$ / greater than 20 $\Omega$	C 19
21	●	●				V Pin 25 to stop-lamp switch and bulb monitoring unit term. 54	greater than 11.5 $\Omega$	C 21
22				●		$\Omega$ Pin 26 to bulb monitoring unit term. KKL Both license-plate bulbs OK / failure of one bulb	less than 20 $\Omega$ / greater than 20 $\Omega$	C 23



### 3. Electrical terminal diagram, BMW active check control unit

1 = Unit plug  
2 = Central indicator lamp  
3 = Washer-fluid sensor  
4 = Coolant sensor  
5 = Instrument cluster  
plug connection X

6 = Oil-level sensor  
7 = Air bag  
8 = Fasten Seat Belt  
9 = Ignition lock  
10 = Light switch

11 = Stop-lamp switch  
12 = Bulb monitoring unit

13 = Upper-beam relay  
14 = Bulb monitoring unit  
(stop lamps, tail lamps,  
license-plate lamp)  
15 = To upper-beam switch

**A10**

Terminal diagram

BMW

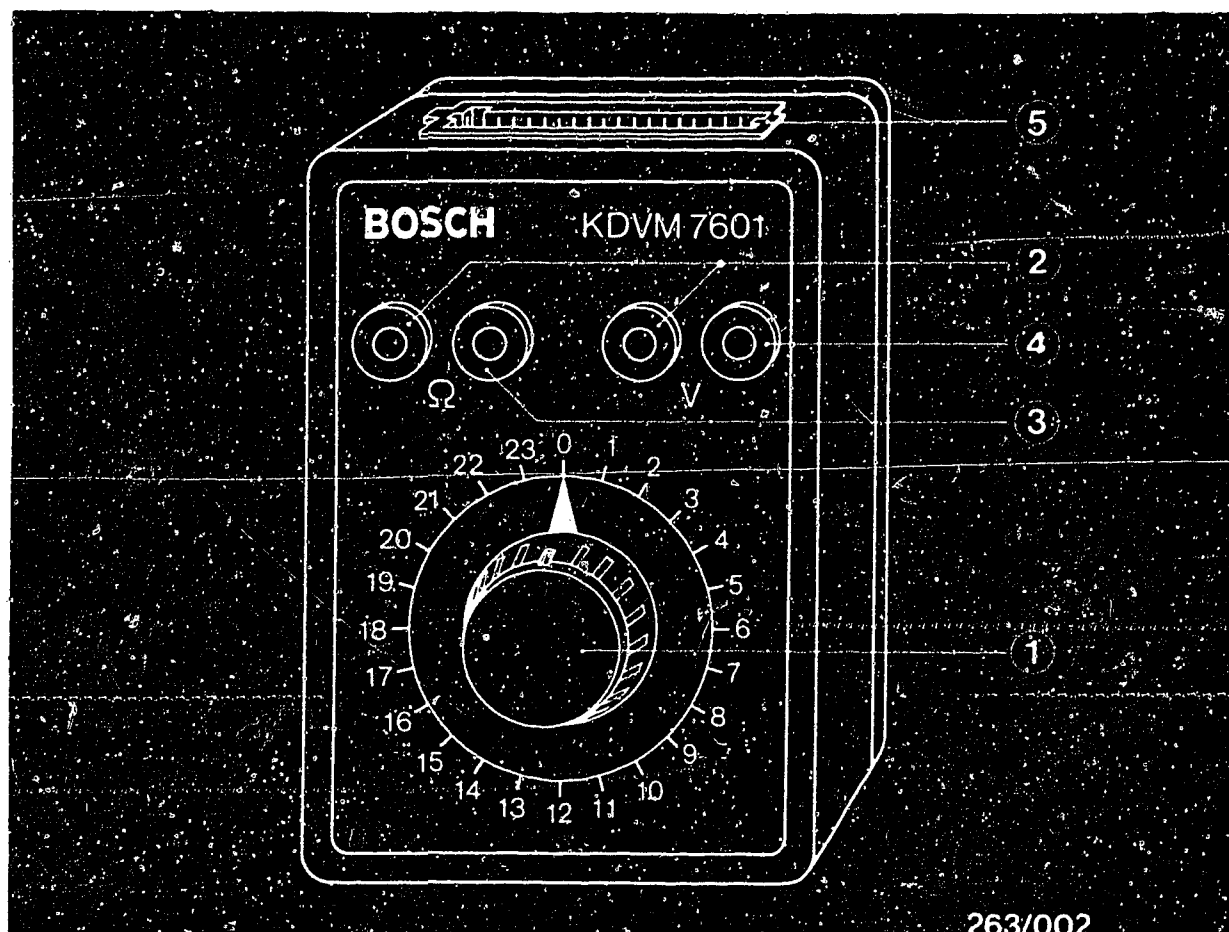


**A11**

Terminal diagram

BMW





- 1 = Program selector switch
- 2 = Test jacks for connection to vehicle ground and ohmmeter/voltmeter
- 3 = Test jack, positive connection for ohmmeter
- 4 = Test jack, positive connection for voltmeter
- 5 = Socket for wiring harness plug

#### 4. Test equipment

Voltmeter	) Analog multimeter	Commercially
Ohmmeter	) $R_i = \min. 20 \text{ k}\Omega$	available
Test adapter	) KDVM 7601	

##### 4.1 Test adapter

Connect test adapter inside vehicle instead of active check control unit. Ignition lock position at P.  
Connect black jacks to vehicle ground using test lead.



## 5. Installation position of components in vehicle

Bulb monitoring unit for  
lower beams:

3 Series: Integrated into engine compartment  
in direction of travel, left in  
fuse box (see top picture).

5 Series: In engine compartment in direction  
of travel, left next to fuse box  
(not illustrated).

Bulb monitoring unit for  
stop lamps, tail lamps,  
license-plate lamp:

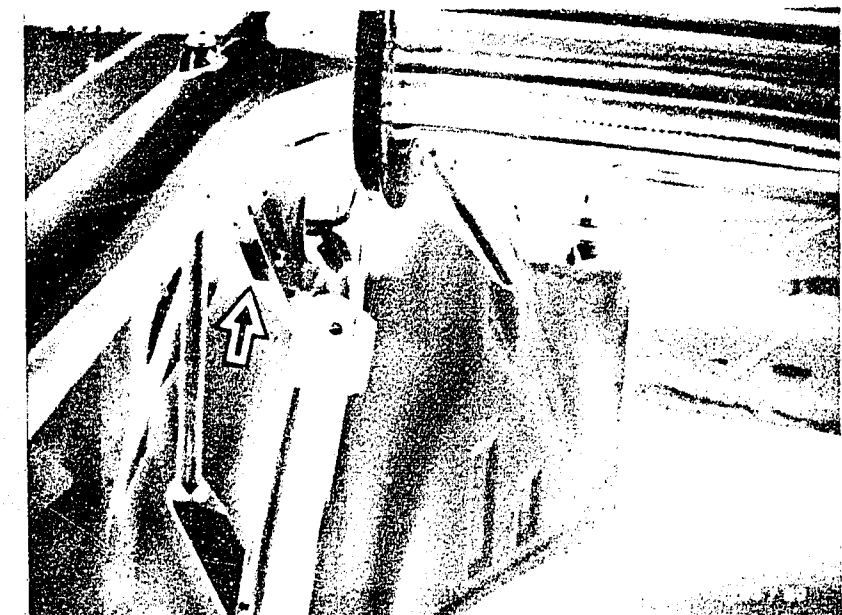
3 Series: In trunk in direction of travel,  
left above wheel arch (see centre  
picture, arrow).

5 Series: In trunk behind rear-wall trim  
in direction of travel, left next  
to centre strut (not illustrated).

Coolant sensor

3 Series: In engine compartment in direction  
of travel, right on expansion tank  
(see bottom picture, arrow).

5 Series: In engine compartment in direction  
of travel, left on expansion tank  
(not illustrated).



**A13**

Installation position of components

BMW



**A14**

Installation position of components

BMW



Installation position of components in vehicle (continued)

Washer-fluid sensor: 3 Series and 5 Series: In engine compartment to the right as viewed in direction of travel, at front of washer-fluid reservoir (see arrow in upper illustration).

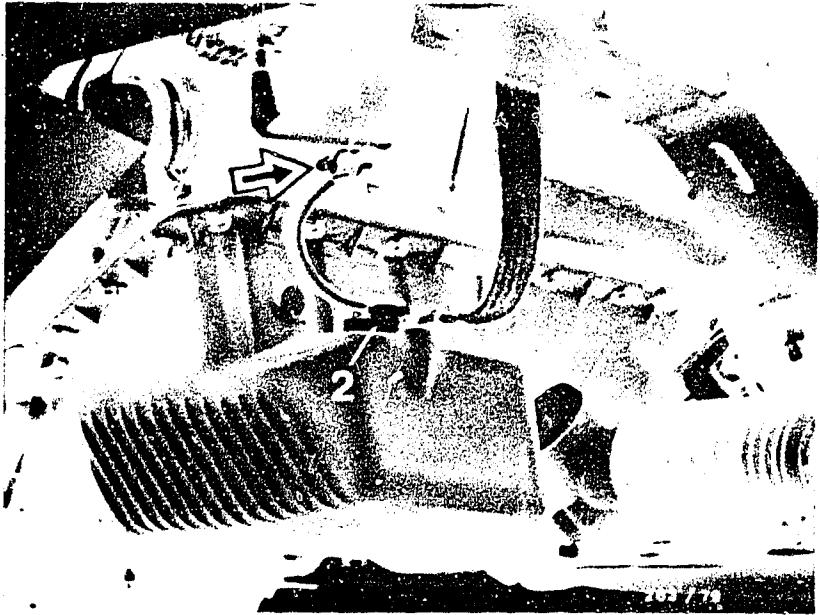
Oil-level sensor: 3 Series: In engine compartment to the left as viewed in direction of travel, inserted in oil pan from above (see lower illustration). 5 Series: In direction of travel in engine compartment at lowest point of oil pan (not illustrated).

Fasten Seat Belt Sensor: In seat belt buckle ) ) not ) illu- ) strated ) O<sub>2</sub> sensor: (Lambda sensor) In exhaust manifold / in forked pipe of exhaust system.

Air bag sensor: Not yet decided



1 = Oil-level sensor plug connection (arrow)  
2 = Oil-level sensor inserted in oil pan from above.



## 6. Trouble-shooting according to customer complaints (fault symptoms)

The table below contains possible fault symptoms, and the right-hand column gives the first coordinate for the appropriate detailed trouble-shooting program.

This program consists of logically-ordered series of test steps for all individual components of the active check control unit, with the exception of the display unit.

<u>Fault symptoms</u>	<u>Coordinates</u>
No display on display unit	B 3, B 5, B 19, C 11
Text panel illumination not lighting up (illumination bulb possibly defective)	-----
Individual functions, such as oil level, washer-fluid level, coolant, or stop lamp, tail lamp, and license plate lamp, not indicated.	B 21 - C 23
All light-emitting diodes lighting up and graph panel illumination no longer goes out.	B 3

**B1**

Trouble-shooting

BMW

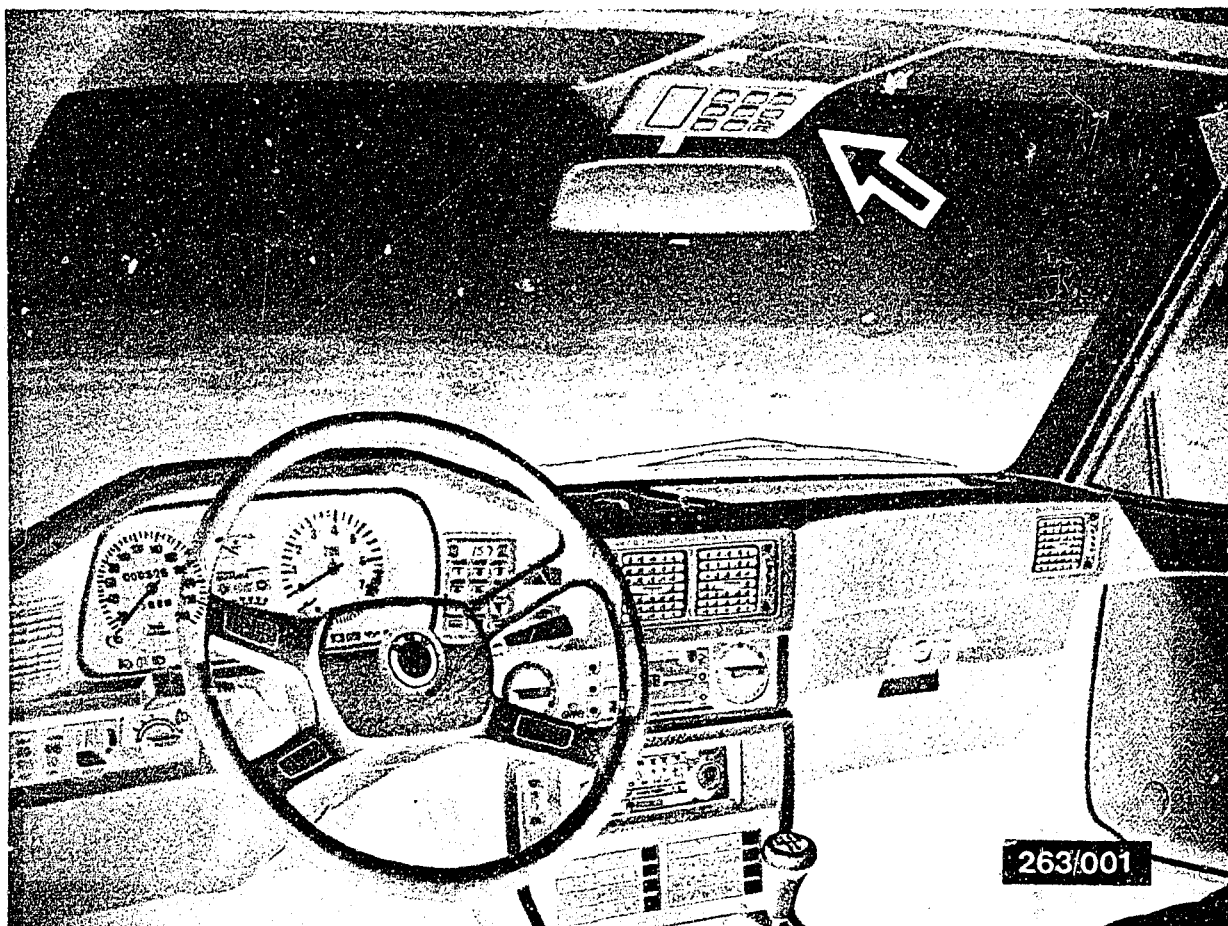
**B2**

Trouble-shooting

BMW







### 7. Rapid test of check control display unit

The display unit is located above the rear-view mirror (arrow) and is held in position by clips.

If, in the event of a fault, it is not possible to determine with certainty whether the defect is in the display unit or in the peripherals, such as wiring harness or sensors, replace the display unit with a new unit. If the fault is then still indicated, connect adapter KDVM 7601 to the wiring-harness plug and test in accordance with test chart.

If fault is no longer indicated, the display unit is defective.





## 8. Trouble-shooting program

The following detailed trouble-shooting program is to be used with test adapter KDVM 7601 and suitable test equipment. It is intended to help workshop employees with little experience or practise on the vehicle to quickly detect causes of trouble in the peripherals (wiring harness, sensors) with the help of a step-by-step trouble-shooting program.



## Test step 1:

### Operation:

Program switch position 1

### Test subject:

Lead from unit plug pin 1 to  
ignition lock term. R

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 - 15 V

### Operation in vehicle:

Ignition lock position R

### Additional operation:

---

### Test equipment reading:

Voltage > 11.5 V or  
battery voltage

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Battery voltage not reached.

### Trouble-shooting with multimeter

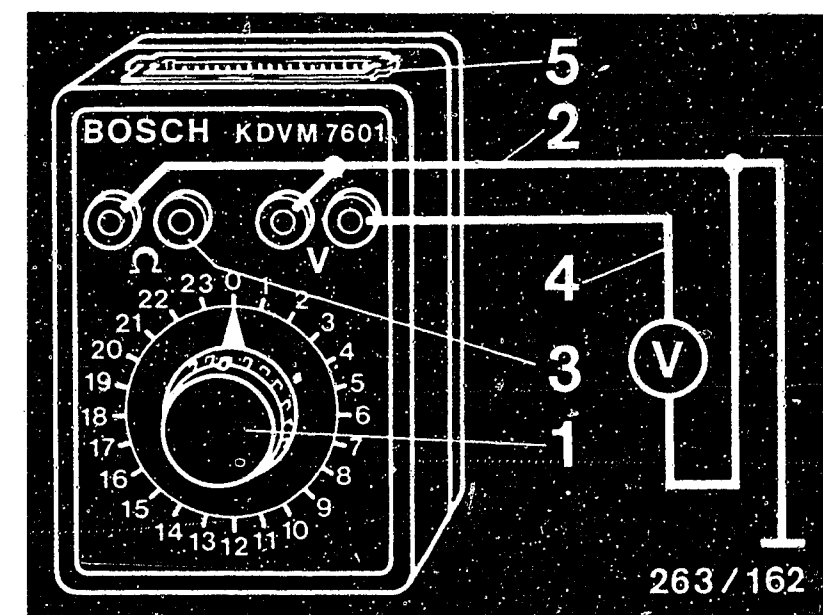
Bring ignition lock into "off" position.  
Disconnect test adapter.  
Test following leads for continuity using  
ohmmeter:

- Lead from wiring-harness plug pin 1  
(see lower illustration) to ignition lock  
term. R
- Fuse for term. R
- Lead to term. 30 on ignition lock.

Nominal reading: approx.  $0\Omega$

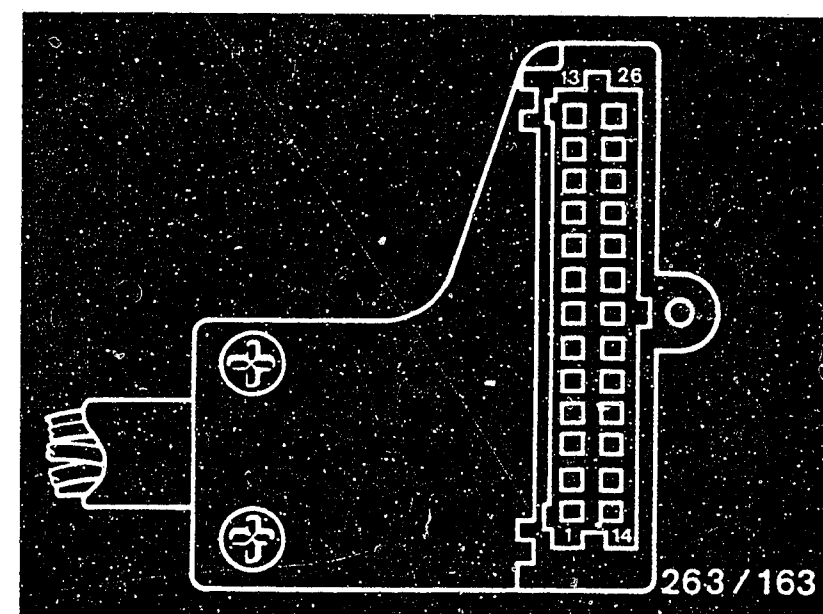
Eliminate contact resistances / open circuits in  
leads.

Replace defective fuse.



- 1 = Program selector switch
- 2 = Test jacks for connection to  
vehicle ground and  
ohmmeter/voltmeter
- 3 = Test jack, positive connection  
for ohmmeter
- 4 = Test jack, positive connection  
for voltmeter
- 5 = Socket for wiring-harness plug

Wiring-harness plug



## Test step 2:

### Operation:

Program switch position 2

### Test subject:

Lead from unit plug pin 2 to central indicator lamp

### Measuring equipment:

Test adapter KDVM 7601

### Measuring range:

---

### Operation in vehicle:

Ignition lock position 15

### Additional operation:

Connect voltmeter jacks together on test adapter.

### Important:

Before switching to program-selector-switch position 3, the shorting link at the sockets of the voltmeter at the test adapter must be removed, as otherwise the test adapter will be destroyed.

### Test equipment reading:

Central indicator lamp lights up.

Does central indicator lamp light up?

yes

Continued on next page

no

### Malfunction:

Central indicator lamp does not light up.

### Trouble-shooting with multimeter:

Ignition lock in "OFF" position.  
Disconnect test adapter from vehicle wire harness.

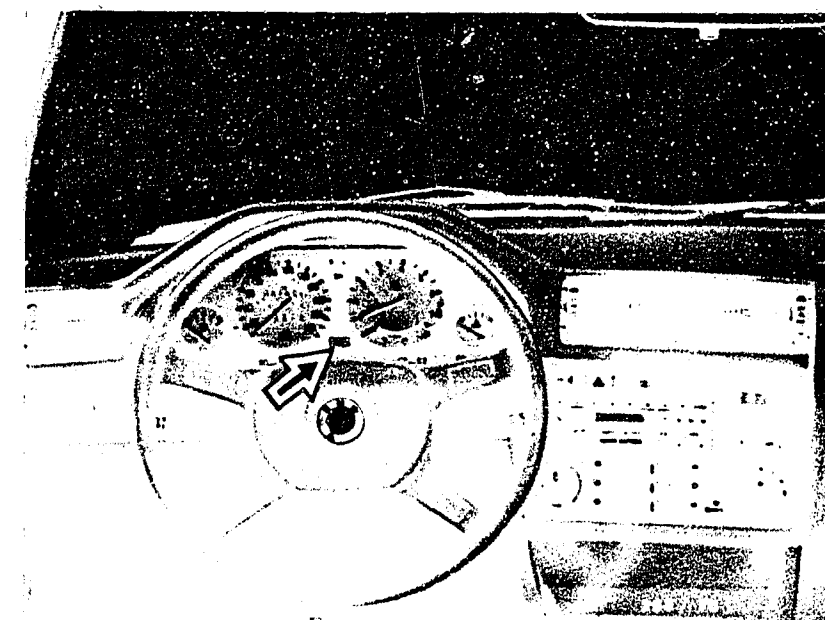
Check following leads for continuity using ohmmeter:

- Lead from wiring-harness plug pin 2 to central indicator lamp.
- Connecting cable from central indicator lamp to terminal 15

Nominal reading: approx. 0  $\Omega$

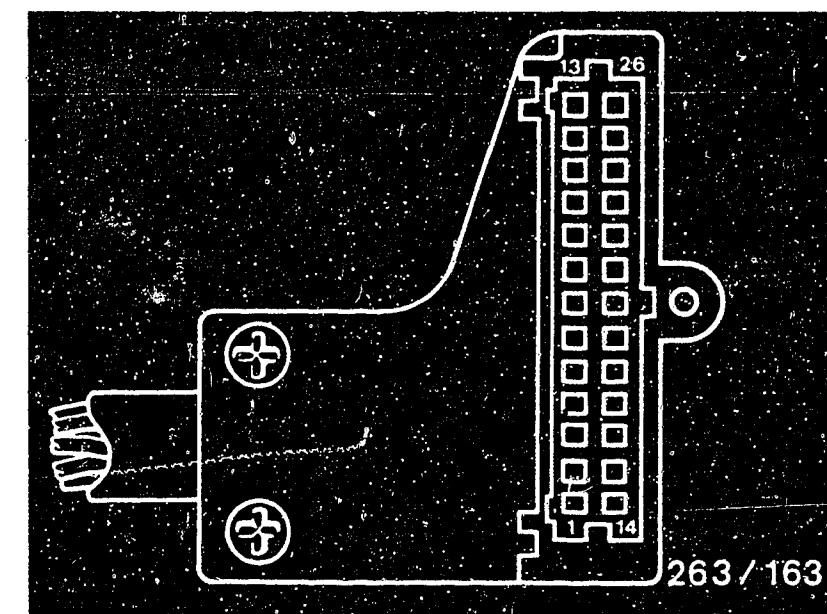
Eliminate contact resistances / open circuits in leads.

Replace defective indicator lamp.



Central indicator lamp is located in the middle of the instrument cluster (arrow)  
(Picture: BMW 3 Series)

Wiring-harness plug



**B7**

Trouble-shooting

BMW



**B8**

Trouble-shooting

BMW



Test step 3: Jumper at voltmeter sockets must have been removed.

Operation:

Program switch position 3

Test subject:

Lead from unit plug pin 4 to  
ignition lock term. 15

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 15 V /  $\Omega$

Operation in vehicle:

Ignition lock position 15

Additional operation:

---

Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

Malfunction:

Battery voltage not reached.

Trouble-shooting with multimeter:

Ignition lock position 0. Disconnect test adapter  
from vehicle wiring harness.

Ignition lock position 15  
Measure voltage with multimeter at pin 4 of  
wiring-harness plug

Nominal voltage: > 11.5 V

If there is no voltage, check fuse.

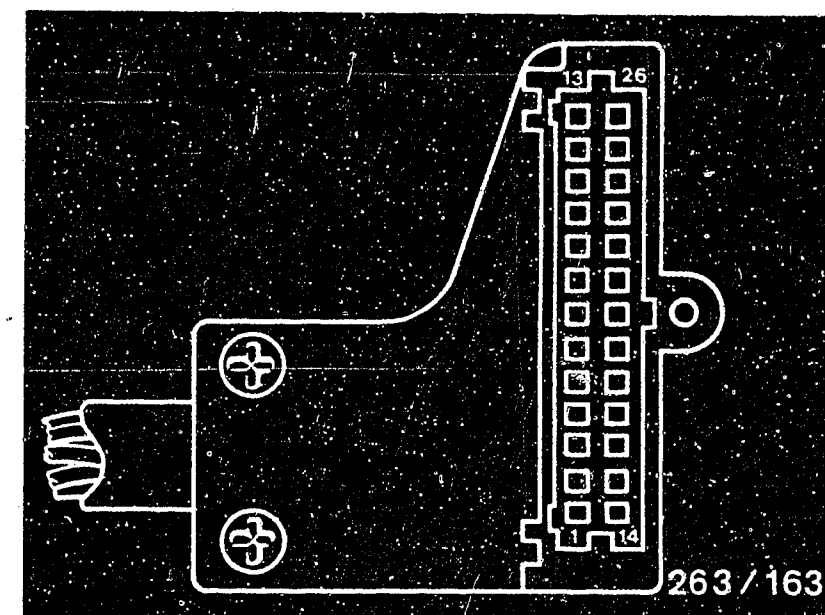
If fuse is OK, check following leads for  
continuity using ohmmeter.

- Supply lead term. 30 from ignition lock
- Supply lead from wiring-harness plug pin 4  
to ignition lock term. 15

Nominal reading: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in  
leads.

Replace defective ignition lock or fuse.



Wiring-harness plug



Test step 4: (Only for export vehicles)

Operation:

Program switch position 4

Test subject:

Lead from wiring-harness plug  
pin 5 to instrument cluster plug  
connection X 36 connection 1

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

> 20 k $\Omega$

Operation in vehicle:

---

Additional operation:

---

Test equipment reading:

> 20 k $\Omega$

Is test specification reached?

yes

Continued on next page

no

Malfunction:

Resistance < 20 k $\Omega$

Trouble-shooting with multimeter

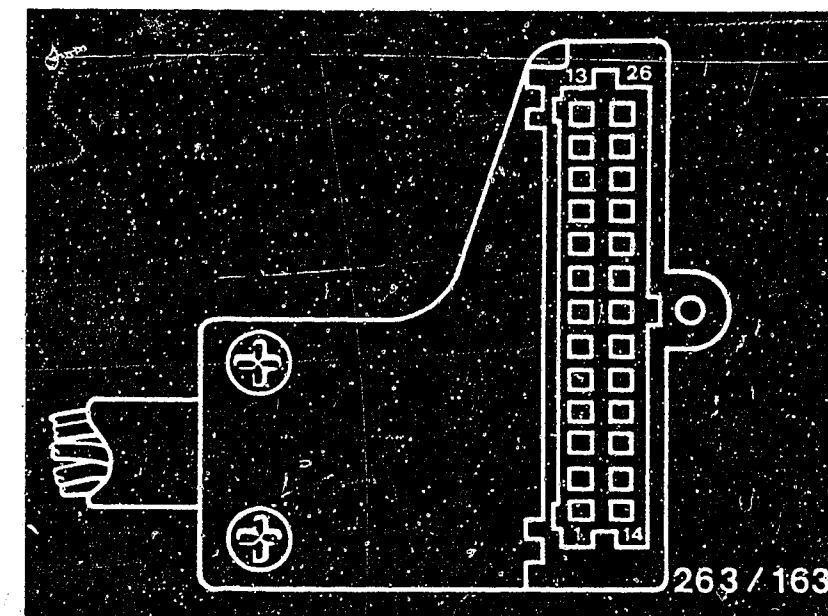
Disconnect test adapter KDVM 7601 from  
vehicle wiring harness.

Check following leads for continuity using  
ohmmeter:

- Lead from pin 5 of wiring-harness plug to  
plug connection X 36 on instrument cluster  
connection 1

Nominal reading: 0  $\Omega$

Eliminate contact resistances / open  
circuits in lead.



Wiring-harness plug

Test step 5 (only for export vehicles)

Operation:

Program switch position 5

Test subject:

Lead from wiring-harness plug  
pin 6 to air bag trigger  
control unit

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 15 V

Operation in vehicle:

Ignition lock position

Additional operation:

Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

Malfunction:

Voltage < 11.5 V

Trouble-shooting with multimeter:

Disconnect test adapter KDVM 7601 from vehicle  
wiring harness. Ignition lock position 0.

Connect voltmeter to pin 6 of wiring-harness plug.

Ignition lock position 15

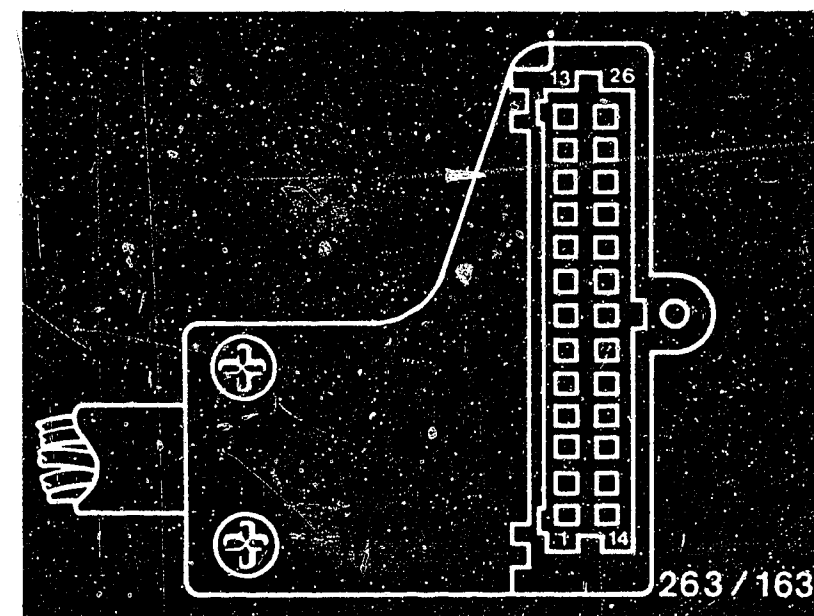
Nominal voltage: > 11.5 V

If voltage is OK, check air bag trigger control  
unit.

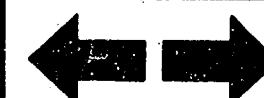
If voltage is < 11.5 V, check lead from  
wiring-harness plug in 6 to trigger control unit  
with ohmmeter at ignition lock position 0.

Nominal resistance: approx. 0  $\Omega$

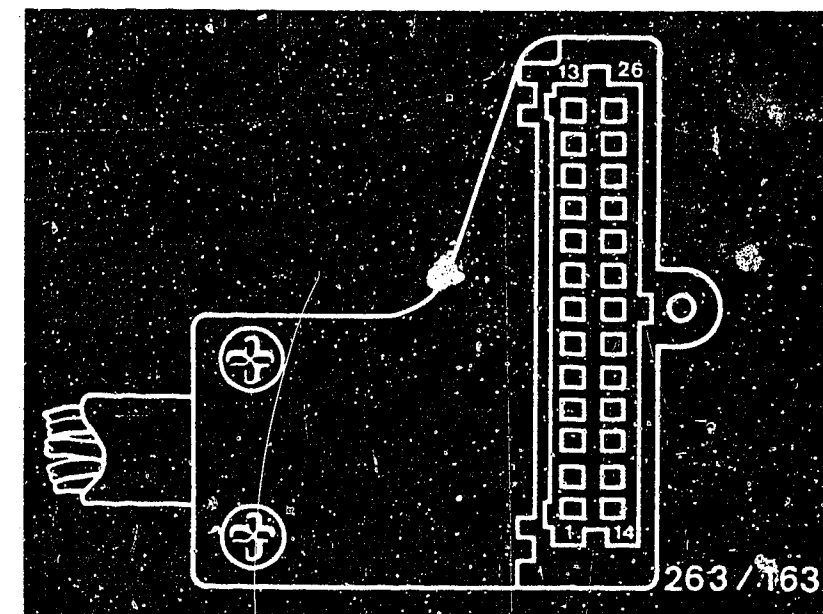
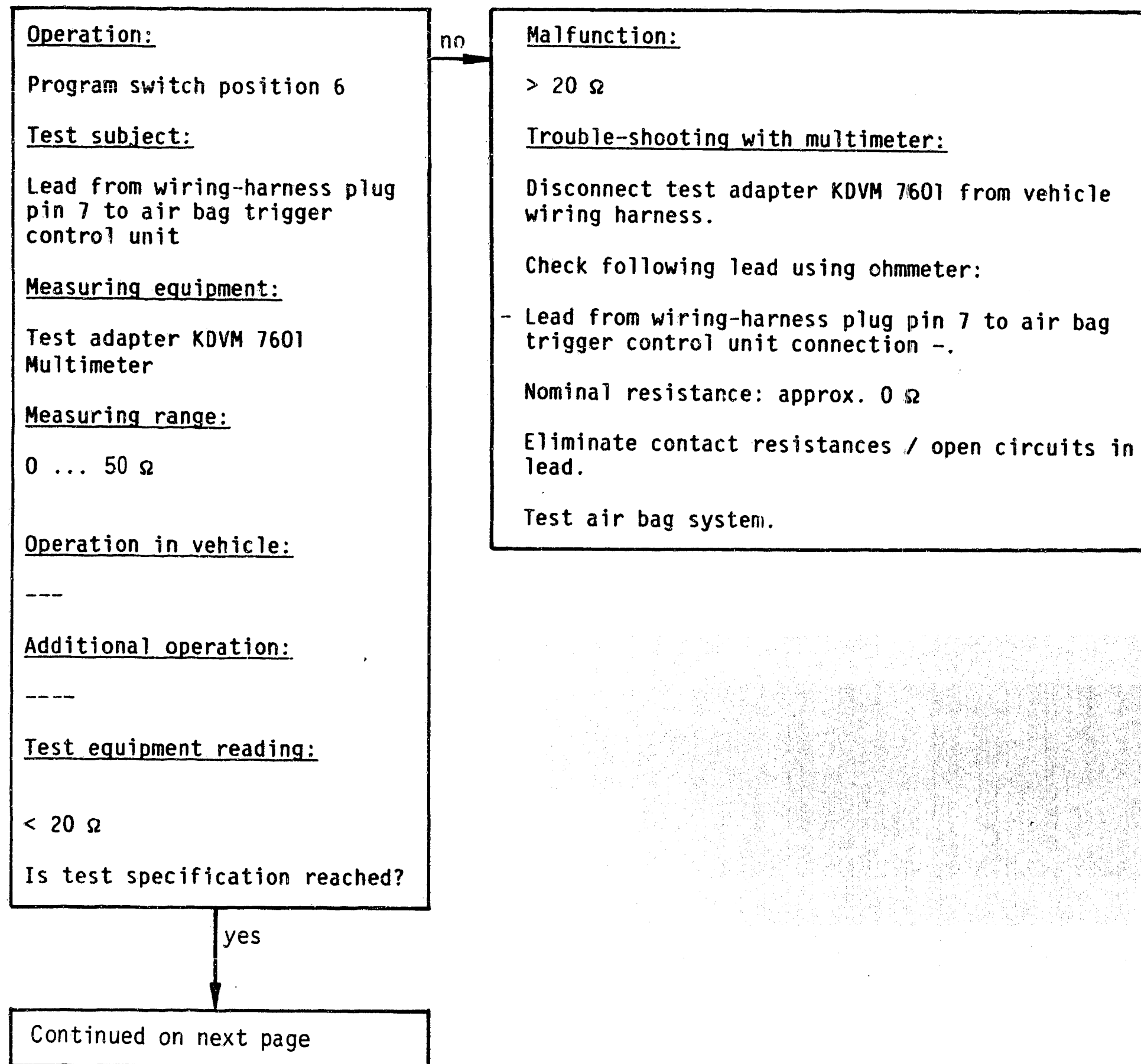
Eliminate contact resistances / open circuits in  
lead.



Wiring-harness plug



Test step 6: (only for export vehicles)



Wiring-harness plug



Test step 7: (only for export vehicles)

Operation:

Program switch position 7

Test subject:

Lead from wiring-harness plug pin 8 to seat belt time-lag relay

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 20 k $\Omega$

Operation in vehicle:

Ignition lock position 15

Additional operation:

Fasten seat belt.

Test equipment reading:

$\geq 20 \text{ k}\Omega$

Is test specification reached?

yes

Continued on next page

no

Malfunction:

With seat belt fastened  $< 20 \text{ k}\Omega$   
With seat belt not fastened  $> 20 \text{ k}\Omega$

Trouble-shooting with multimeter:

Disconnect test adapter KDVM 7601 from vehicle wiring harness.

Check following lead with ohmmeter.

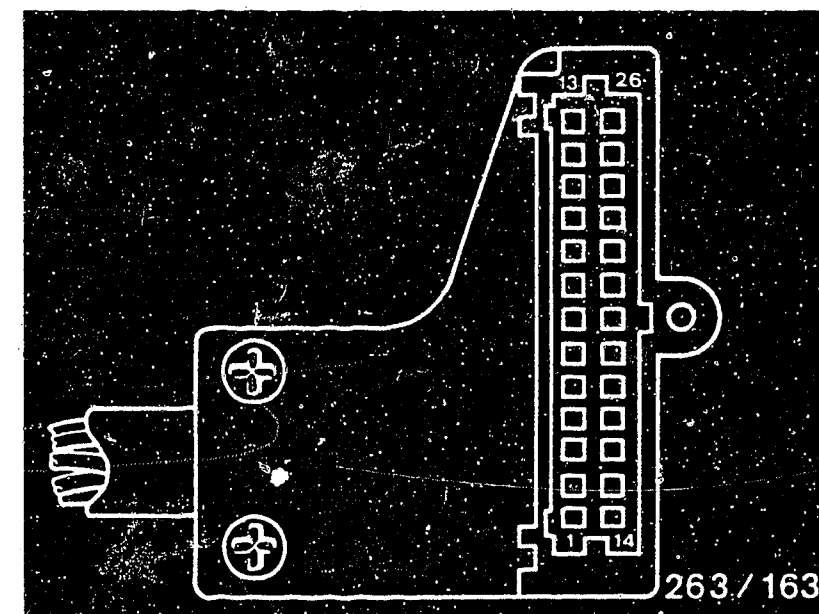
- Lead from wiring-harness plug pin 8 to seat-belt time-lag relay (located on steering-column support)

Nominal resistance: approx.  $0 \Omega$

Eliminate contact resistances / open circuits in lead.

Seat-belt buckle defective.

Replace seat-belt buckle.



Wiring-harness plug





Test step 8:

Operation:

Program switch position 8

Test subject:

Lead from wiring-harness plug pin 9 to vehicle ground

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 50  $\Omega$

Operation in vehicle:

---

Additional operation:

---

Test equipment reading:

< 20  $\Omega$

Is test specification reached?

yes

Continued on next page

no

Malfunction:

$\geq 20 \Omega$

Trouble-shooting with multimeter:

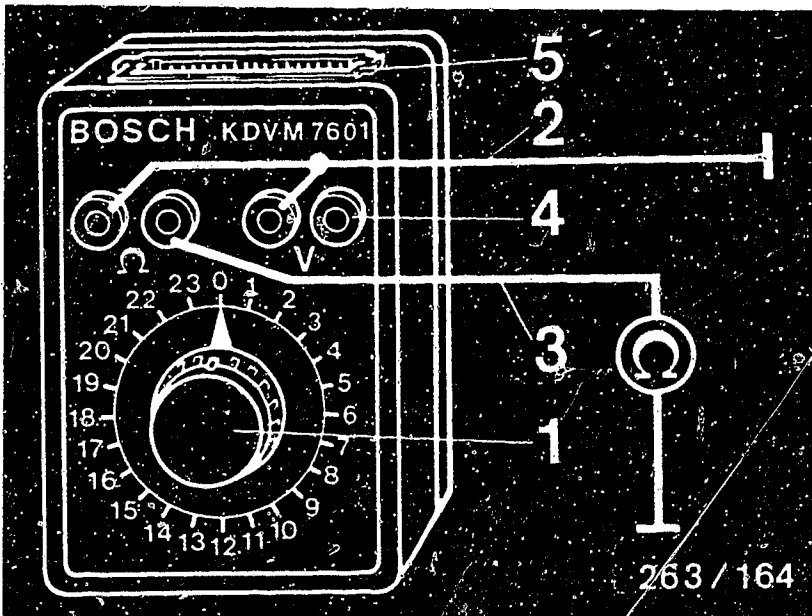
Disconnect test adapter KDVM 7601 from vehicle wiring harness.

Check following lead with ohmmeter.

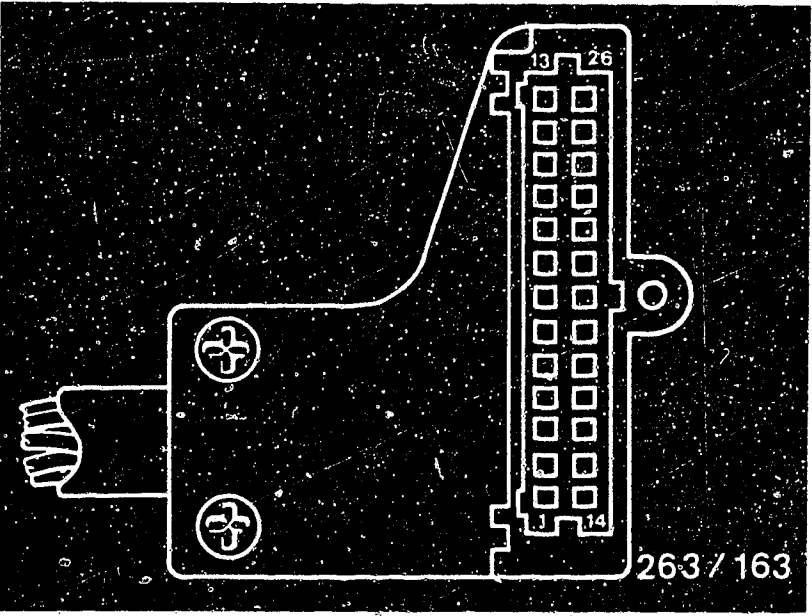
- Lead from wiring-harness plug pin 9 to vehicle ground

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistance / open circuit in lead.



- 1 = Program selector switch
  - 2 = Test jacks for connection to vehicle ground and ohmmeter/voltmeter
  - 3 = Test jack, positive connection for ohmmeter
  - 4 = Test jack, positive connection for voltmeter
  - 5 = Socket for wiring-harness plug
- Wiring-harness plug



## Test step 9:

### Operation:

Program switch position 9

### Test subject:

Lead from wiring-harness plug pin 11 to bulb monitoring unit and light switch term. 58 R

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 15 V

### Operation in vehicle:

Ignition lock position "R"

### Additional operation:

Side-marker lamp switched on

### Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Battery voltage not reached.

### Trouble-shooting with multimeter:

Disconnect test adapter KDVM from vehicle wiring harness.

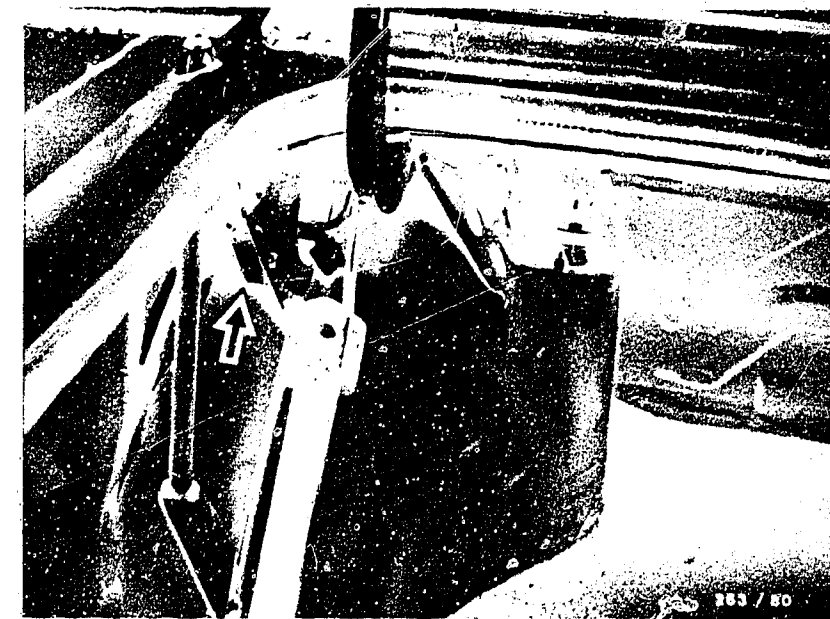
Check following leads using ohmmeter.

- Lead from wiring-harness plug pin 11 to bulb monitoring unit term. 58 R
- Lead from bulb monitoring unit term. 58 R to light switch term. 58 R

Nominal resistance approx. 0  $\Omega$

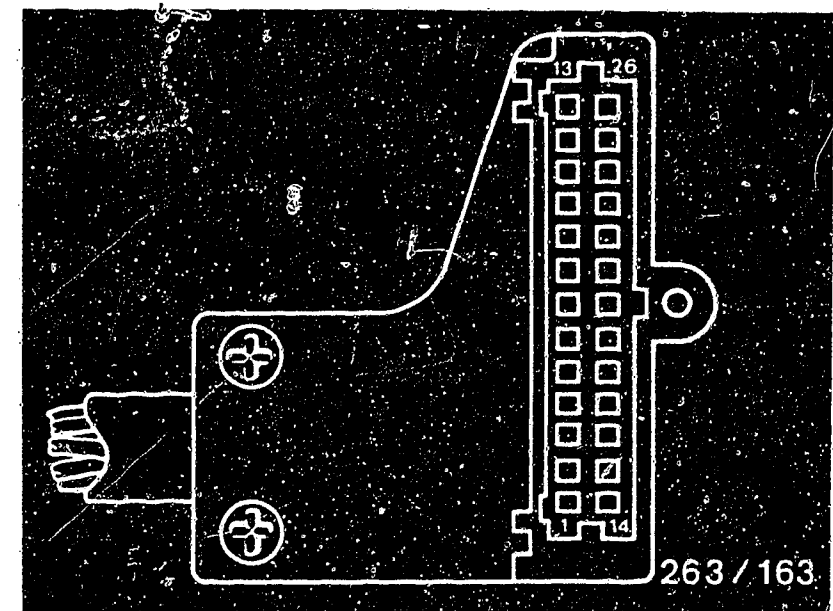
Illuminate contact resistances / open circuits in leads.

Tail-lamp bulb defective. Replace defective tail-lamp bulb.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug



## Test step 10

### Operation:

Program switch position 10

### Test subject:

Lead from wiring-harness plug pin 12 to bulb monitoring unit and light switch term. 58 L

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 15 V

### Operation in vehicle:

Ignition lock position R

### Additional operation:

Side-marker lamp switched on

### Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Battery voltage not reached.

### Trouble-shooting with multimeter:

Ignition lock position "0".  
Disconnect test adapter KDVM 7601 from vehicle wiring harness.

Check the following leads using ohmmeter.

- Lead from wiring-harness plug pin 12 to bulb monitoring unit term. 58 L
- Lead from bulb monitoring unit term. 58 L to light switch term. 58 L

Nominal resistance: approx. 0  $\Omega$

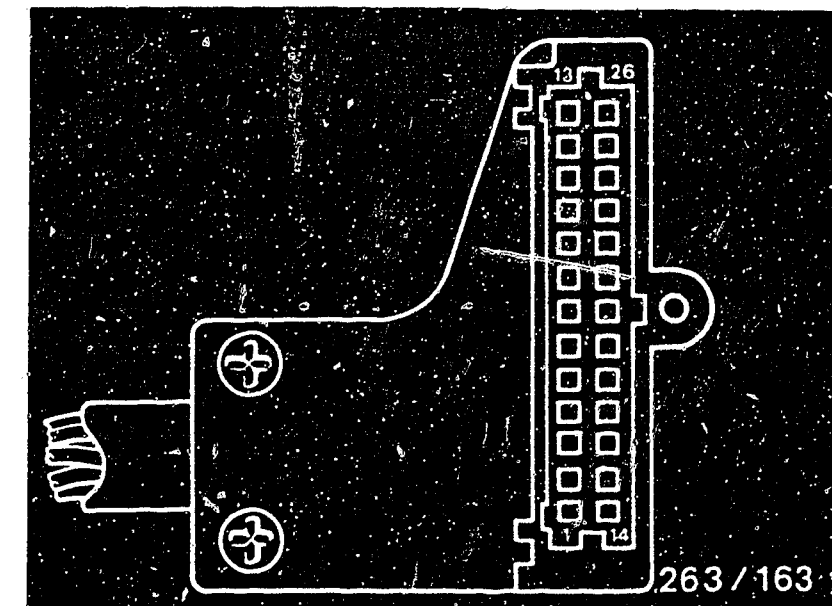
Eliminate contact resistances / open circuits.

Tail-lamp bulb defective. Replace defective tail-lamp bulb.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug



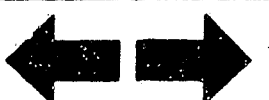
**B23**

Trouble-shooting  
BMW



**B24**

Trouble-shooting  
BMW



Test step 11:

Operation:

Program switch position 11

Test subject:

Lead from wiring-harness plug pin 13 to bulb monitoring unit term. 58 KL

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 50  $\Omega$

Operation in vehicle:

---

Additional operation:

Side-marker lamp on

Test equipment reading:

< 20  $\Omega$

Is test specification reached?

yes

Continued on next page

no

Malfunction:

Resistance > 20  $\Omega$

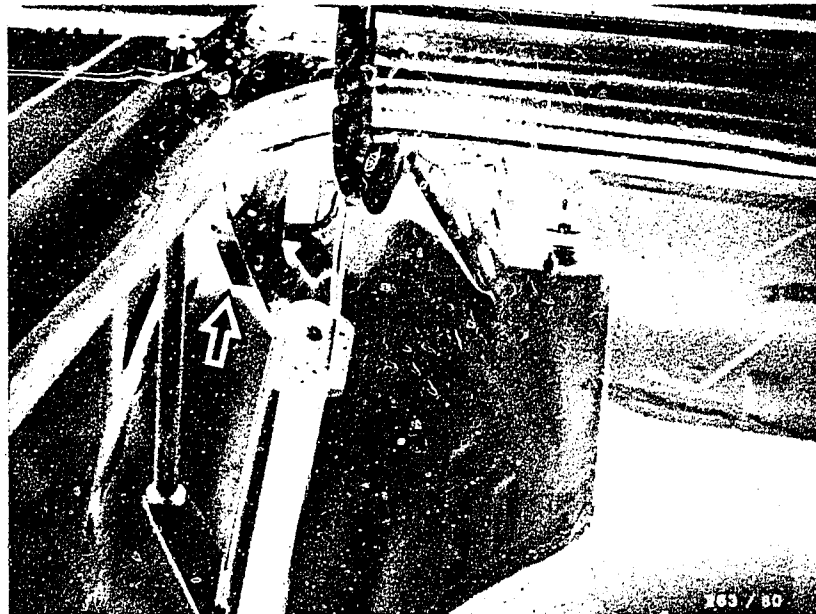
Trouble-shooting with multimeter

Turn off side-marker lamp. Disconnect test adapter KDVM 7601 from vehicle wiring harness. Check following lead using ohmmeter.

- Lead from wiring-harness plug pin 13 to bulb monitoring unit term. 58 KL

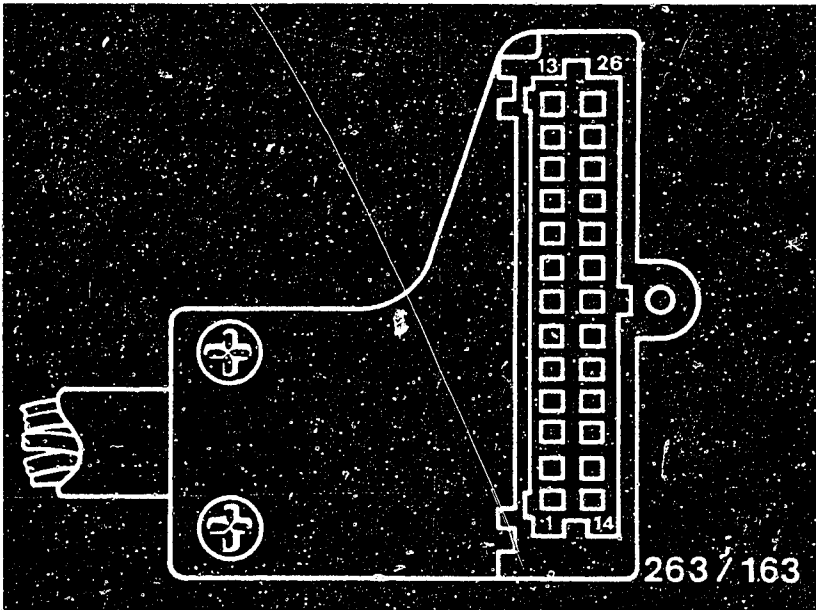
Nominal resistance approx. 0  $\Omega$

Eliminate contact resistances / open circuits in lead.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug



## Test step 12:

### Operation:

Program switch position 12

### Test subject:

Lead from wiring-harness plug  
pin 15 to ignition lock term. 30

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 15 V

### Operation in vehicle:

---

### Additional operation:

---

### Test equipment reading:

> 11.5 or battery voltage

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Resistance < 11.5 V, or battery voltage  
not reached.

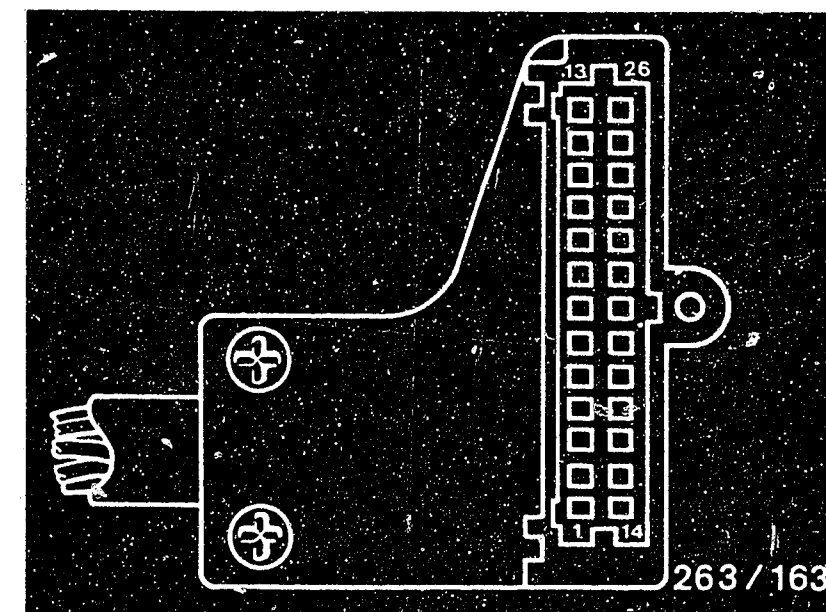
### Trouble-shooting with multimeter

Disconnect test adapter KDVM 7601 from vehicle  
wiring harness.  
Check following lead using ohmmeter.

- Lead from wiring-harness plug pin 15 to  
ignition lock term. 30

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in  
lead.



Wiring-harness plug



### Test step 13:

#### Operation:

Program switch position 13

#### Test subject:

Lead from wiring-harness plug pin 16 to oil-level sensor (static)

#### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

#### Measuring range:

0 ... 50  $\Omega$

#### Operation in vehicle:

#### Additional operation:

#### Test equipment reading:

$\leq 20 \Omega$

Is test specification reached?

yes

Continued on next page

no

#### Malfunction:

Resistance  $> 20 \Omega$

#### Testing with multimeter

Disconnect test adapter KDVM 7601 from vehicle wiring harness.

Check following lead using ohmmeter.

- Lead from wiring-harness plug pin 16 to static oil-level sensor.

Nominal resistance: approx. 0  $\Omega$

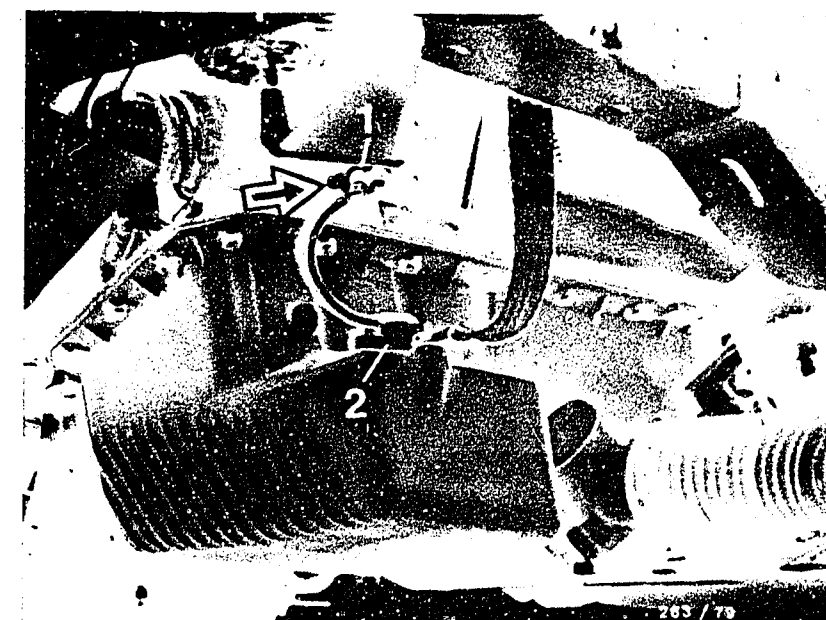
Eliminate contact resistances / open circuits in lead.

If lead is OK and resistance is  $> 20 \Omega$ , add approx. 1 l oil.

Then repeat testing.

If resistance is approx.  $< 20 \Omega$ , oil-level sensor is defective.

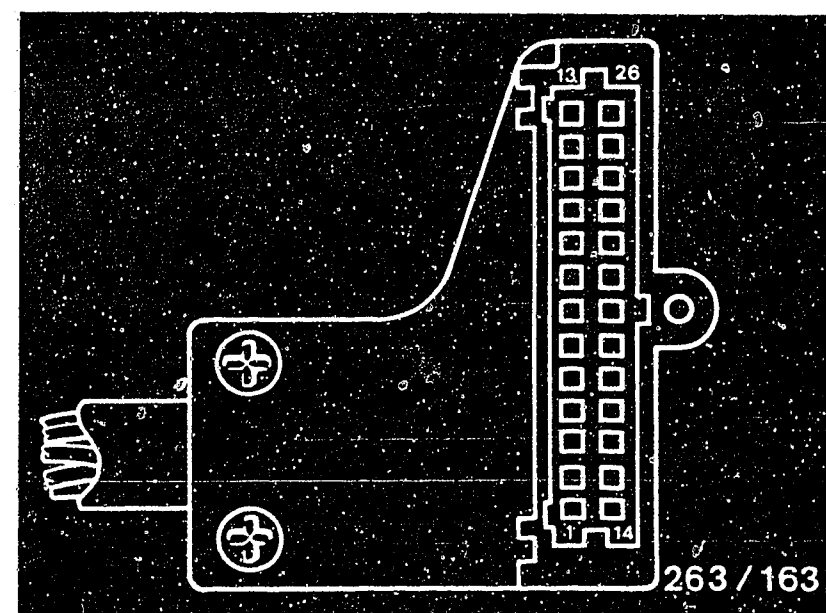
Replace oil-level sensor.



BMW 3 Series  
1 = Oil-level sensor plug connection (arrow)  
2 = Oil-level sensor inserted in oil pan from above

BMW 5 Series (not illustrated)

Wiring-harness plug



C5

Trouble-shooting

BMW



C6

Trouble-shooting

BMW





## Test step 14:

### Operation:

Program switch position 14

### Test subject:

Lead from wiring-harness plug pin 17 to washer-fluid sensor

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 50  $\Omega$

### Operation in vehicle:

### Additional operation:

Washer-fluid level OK

### Test equipment reading:

< 20  $\Omega$

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Resistance  $\geq 20 \Omega$

### Testing with multimeter

Disconnect test adapter KDVM 7601 from vehicle wiring harness.

Check following leads using ohmmeter.

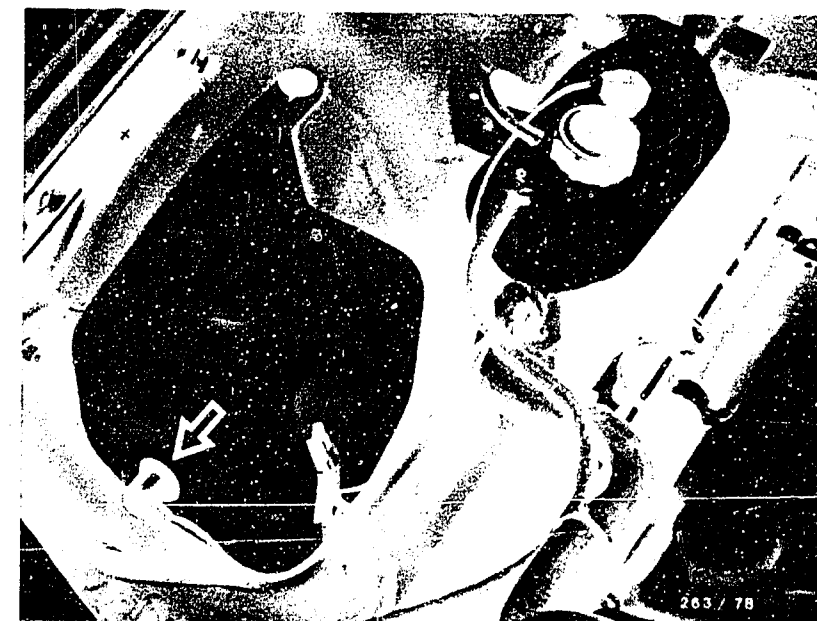
- Lead from wiring-harness plug pin 17 to washer-fluid sensor
- Lead from washer-fluid sensor to ground

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in leads.

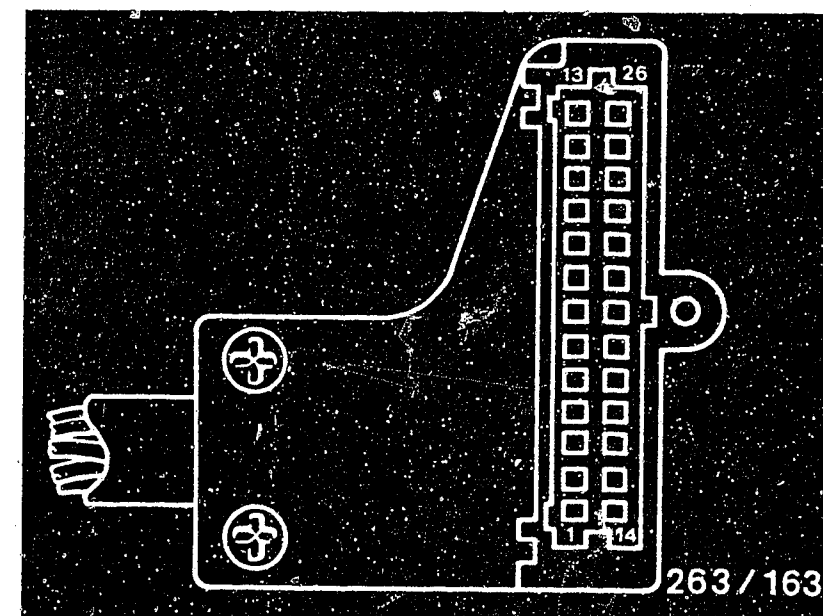
Washer-fluid sensor defective.

Replace washer-fluid sensor.



Washer-fluid sensor is located in engine compartment to the right as seen from direction of travel on the front of the washer-fluid reservoir (arrow, 3 Series).

Wiring-harness plug



**C7**

Trouble-shooting  
BMW

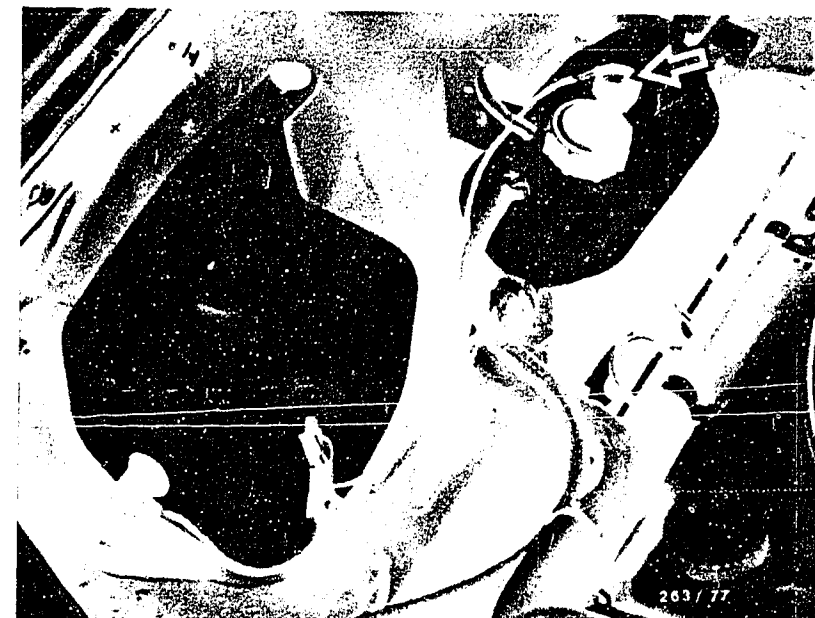
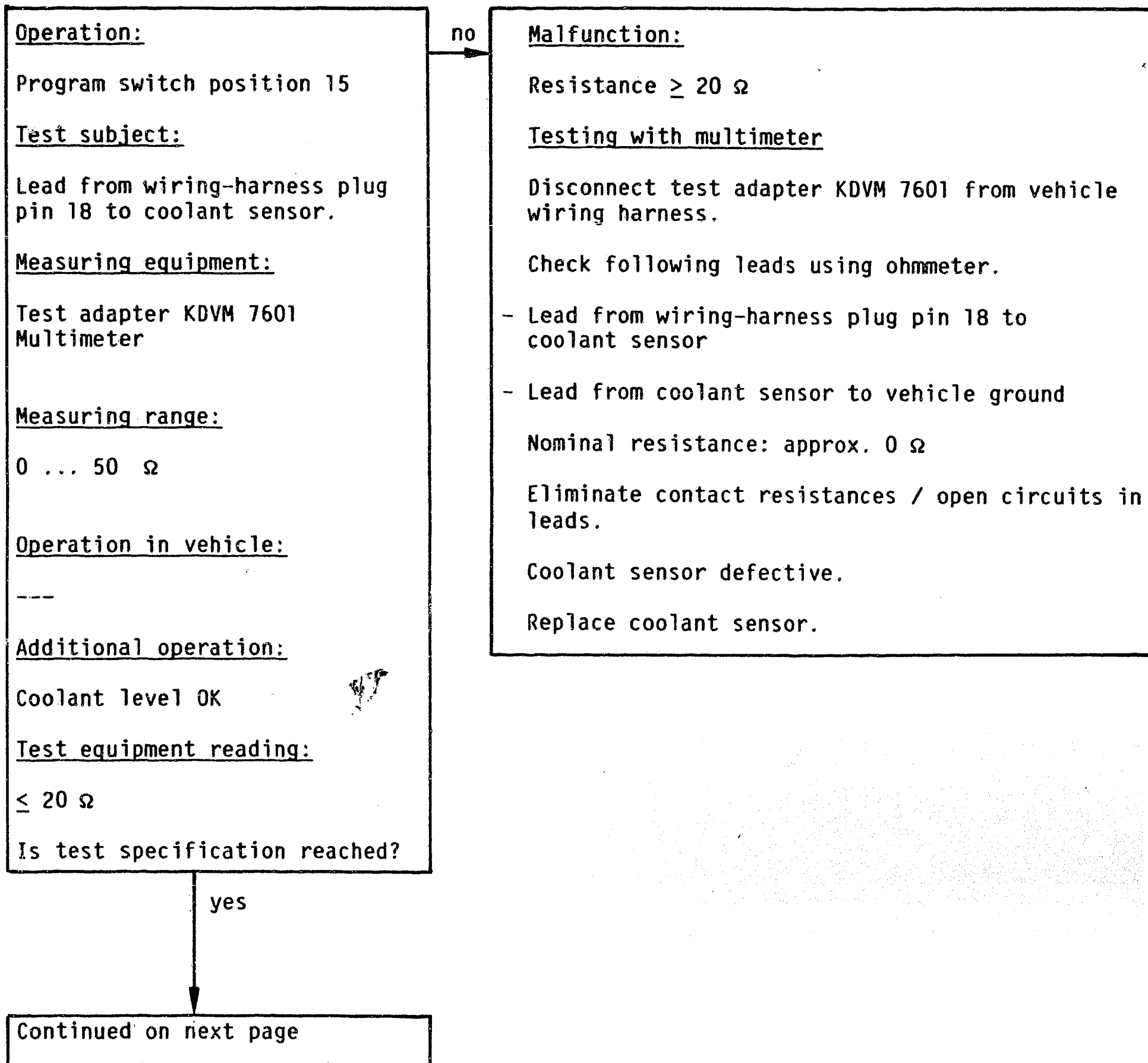


**C8**

Trouble-shooting  
BMW

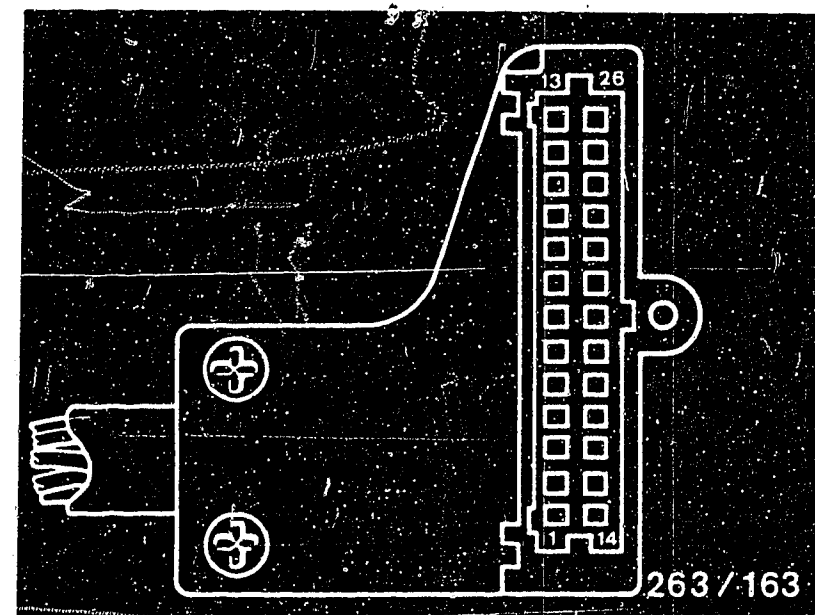


Test step 15:



3 Series:  
Cooling-water sensor is located in direction of travel (on the right in 3 Series, on left in 5 Series) in engine compartment on expansion tank. (Arrow, 3 Series)

Wiring-harness plug





## Test step 16:

### Operation:

Program switch position 16

### Test subject:

Lead from wiring-harness plug pin 20 to oil-level sensor (dyn.).

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 10 k $\Omega$

### Operation in vehicle:

---

### Additional operation:

Oil level OK

### Test equipment reading:

1 k $\Omega$

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Resistance < 50  $\Omega$  if insufficient oil  
Resistance > 5 k $\Omega$  if open circuit in lead

### Testing with multimeter

Disconnect test adapter KDVM 7601 from vehicle wiring harness.  
Pull plug on oil-level sensor. Check following lead using ohmmeter.

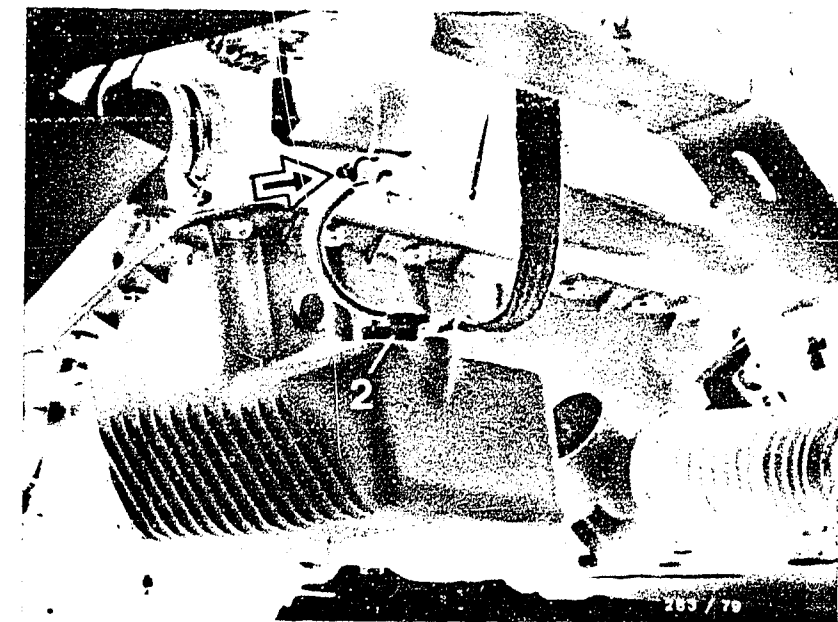
- Lead from wiring-harness plug pin 20 to oil-level sensor

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in lead.

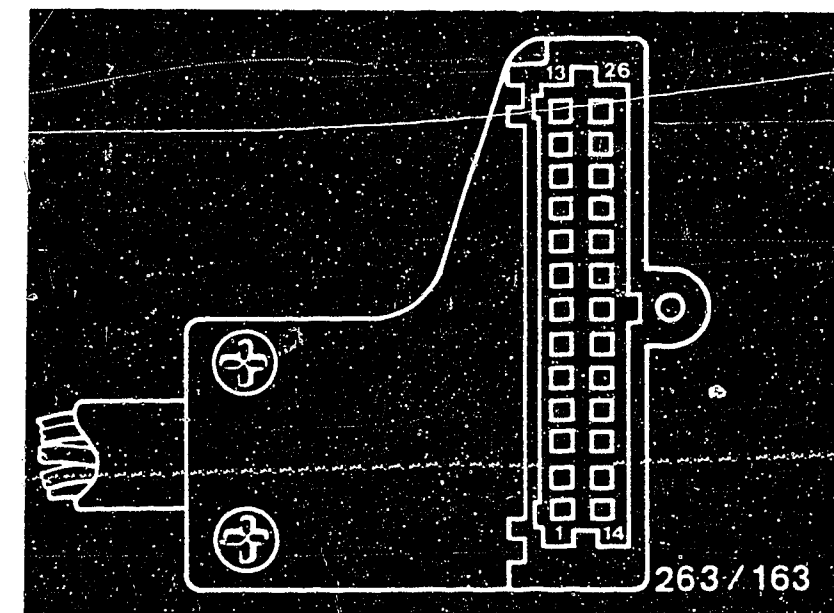
Oil-level sensor defective.

Replace oil-level sensor.



- 1 = Oil-level sensor plug connection (arrow)
- 2 = Oil-level sensor inserted in oil pan from above
- 3 Series
- 5 Series (not illustrated)

Wiring-harness plug



**C11**

Trouble-shooting

BMW



**C12**

Trouble-shooting

BMW



## Test step 17:

### Operation:

Program switch position 17

### Test subject:

Lead from wiring-harness plug pin 21 to bulb monitoring unit and upper-beam relay.

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 15 V

### Operation in vehicle:

Ignition lock position 15

### Additional operation:

Low beams switched on

### Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

< 11.5 V battery voltage is not reached.

### Testing with multimeter

Ignition lock position "OFF"

Lower beams switched off.

Disconnect test adapter from vehicle wiring harness.

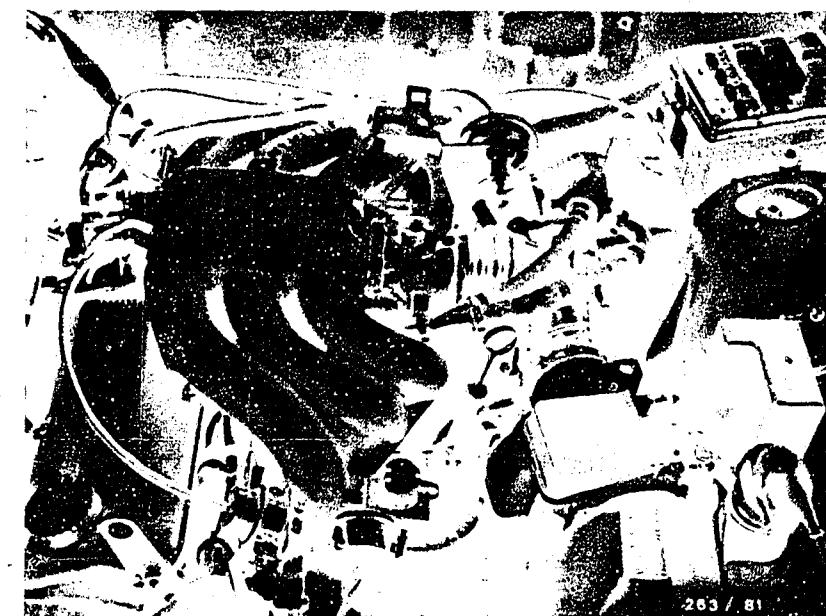
- Check following leads using ohmmeter.
- Lead from wiring-harness plug pin 21 to bulb monitoring unit for upper beams
- Lead from wiring-harness plug pin 21 to upper-beam relay term. 87

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in lead.

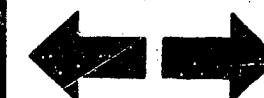
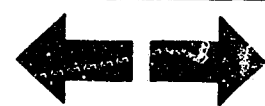
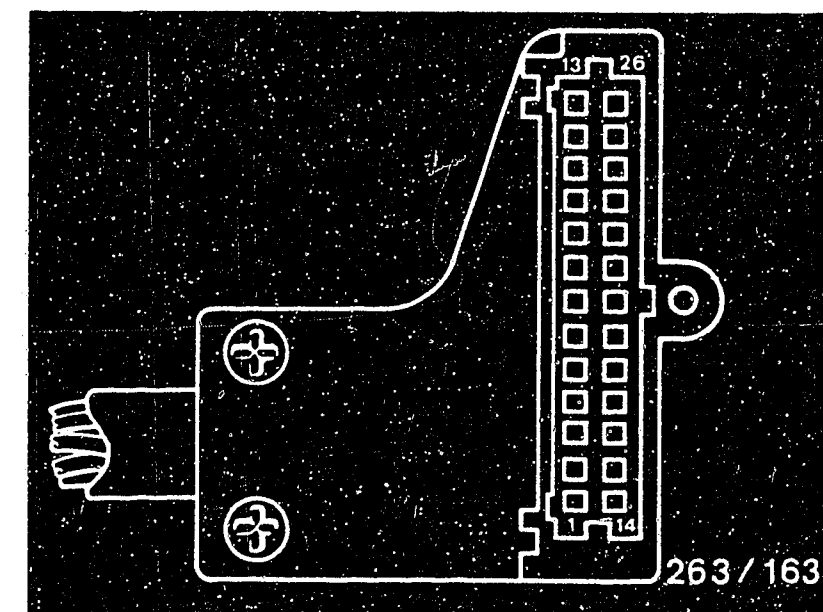
Fuse/upper-beam relay/bulb monitoring relay/lower-beam bulbs defective.

Replace defective parts.



Lamp indicator unit for lower beam is located on 3 Series in fuse box and on 5 Series next to fuse box in engine compartment in direction of travel, left (picture 3 Series)

Wiring-harness plug



## Test step 18:

### Operation:

Program switch position 18

### Test subject:

Lead from wiring-harness plug  
pin 22 to bulb monitoring unit  
term. K

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 50  $\Omega$

### Operation in vehicle:

Ignition lock position 15

### Additional operation:

Lower beams switched on

### Test equipment reading:

< 20  $\Omega$

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Resistance > 20  $\Omega$

### Testing with multimeter

Ignition lock position "0"

Lower beams switched off.

Disconnect test adapter KDVM 7601 from  
wiring-harness plug.

Check following lead using ohmmeter.

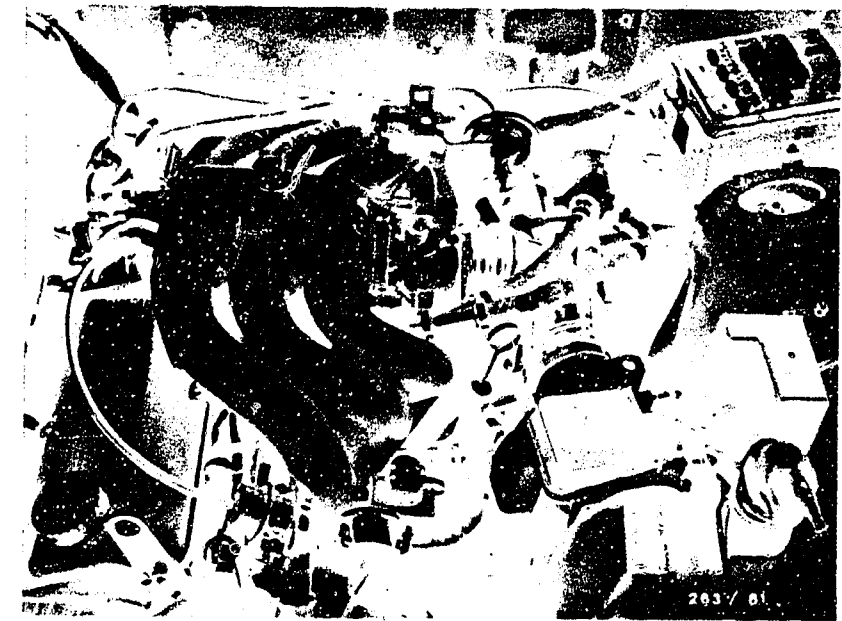
-- Lead from wiring-harness plug pin 22 to  
bulb monitoring unit term. K for lower  
beams

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in  
lead.

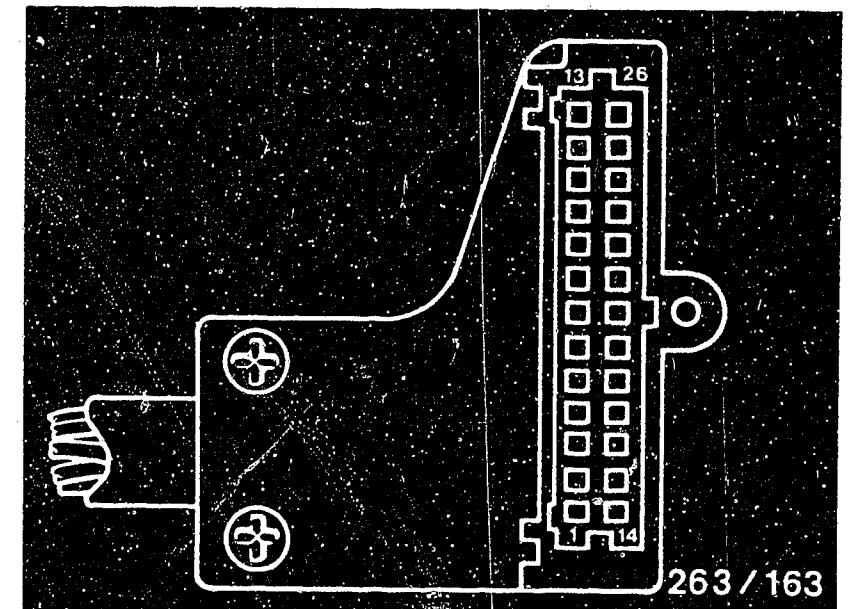
Bulb monitoring unit / lower beams defective.

Replace defective parts.



Lamp indicator unit for lower beam  
is located on 3 Series in fuse box  
and on 5 Series next to fuse box  
in engine compartment in direction  
of travel, left (picture 3 Series)

Wiring-harness plug



Test step 19:

Operation:

Program switch position 19

Test subject:

Lead from wiring-harness plug pin 23 to stop-lamp switch, and via fuse to ignition lock.

Measuring equipment:

Test adapter KDVM 7601  
Multimeter

Measuring range:

0 ... 15 V

Operation in vehicle:

Ignition lock position R

Additional operation:

---

Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

no

Malfunction:

< 11.5 V or battery voltage not reached.

Testing with multimeter

Ignition lock position "0"  
Disconnect test adapter KDVM 7601 from vehicle wiring-harness plug.

Check following leads using ohmmeter.

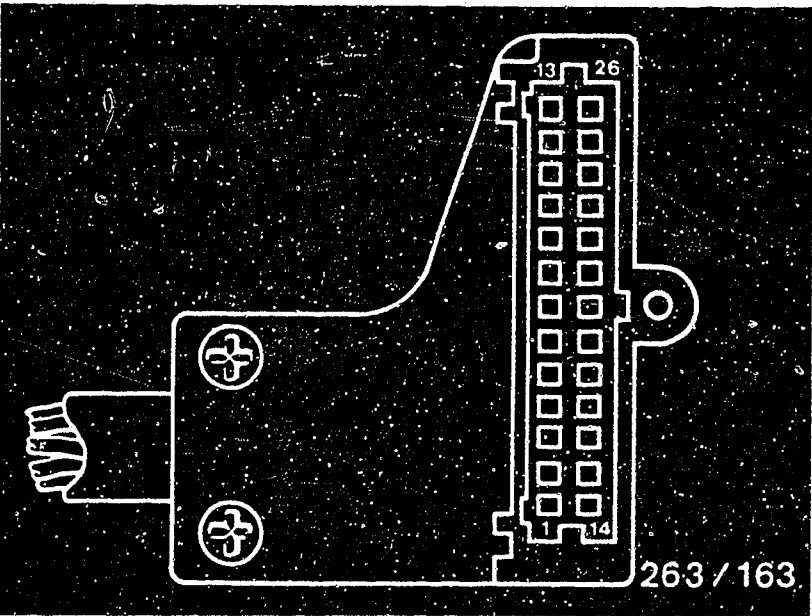
- Lead from wiring-harness plug pin 23 to stop-lamp switch.
- Lead from wiring-harness plug pin 23 to ignition lock via fuse.

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits.

Fuse or ignition lock defective.

Replace defective parts.



Wiring-harness plug

yes

Continued on next page



## Test step 20:

### Operation:

Program switch position 20

### Test subject:

Lead from wiring-harness plug pin 24 to bulb monitoring unit term. 54 L (stop, tail, license-plate lamps)

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 50  $\Omega$

### Operation in vehicle:

Ignition lock position R

### Additional operation:

Brake pedal depressed

### Test equipment reading:

< 20  $\Omega$

Is test specification reached?

yes

Continued on next page

no

### Malfunction:

Resistance > 20  $\Omega$

### Testing with multimeter

Ignition lock position "0"  
Brake pedal not depressed.  
Test adapter KDVM 7601 disconnected from vehicle wiring harness.

Check following lead using ohmmeter.

- Lead from wiring-harness plug pin 24 to bulb monitoring unit term. 54 L.  
Nominal resistance: approx. 0  $\Omega$
- Eliminate contact resistances / open circuits in lead.

Nominal resistance: approx. 0  $\Omega$

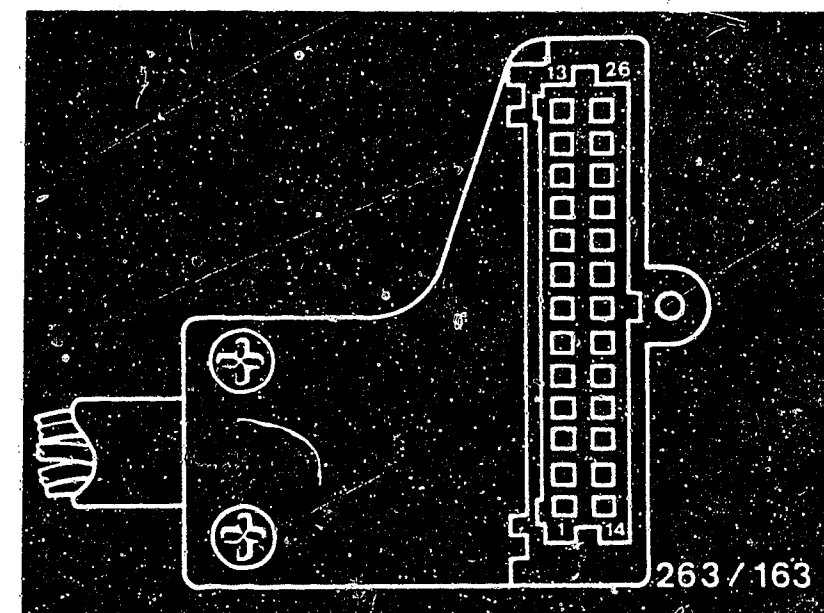
Bulb monitoring unit or stop-lamp bulbs defective.

Replace defective parts.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug



# Test step 21:

## Operation:

Program switch position 21

## Test subject:

Lead from wiring-harness plug pin 25 to stop-lamp switch and bulb monitoring unit term. 54 (stop, tail, license-plate lamps)

## Measuring equipment:

Test adapter KDVM 7601  
Multimeter

## Measuring range:

0 ... 15 V

## Operation in vehicle:

Ignition lock position R

## Additional operation:

Brake pedal depressed

## Test equipment reading:

> 11.5 V or battery voltage

Is test specification reached?

yes

Continued on next page

no

## Malfunction:

< 11.5 V or battery voltage not reached

## Testing with multimeter

Ignition lock position "0"  
Brake pedal not depressed.  
Test adapter KDVM 7601 disconnected from vehicle wiring harness.

Check following leads using ohmmeter.

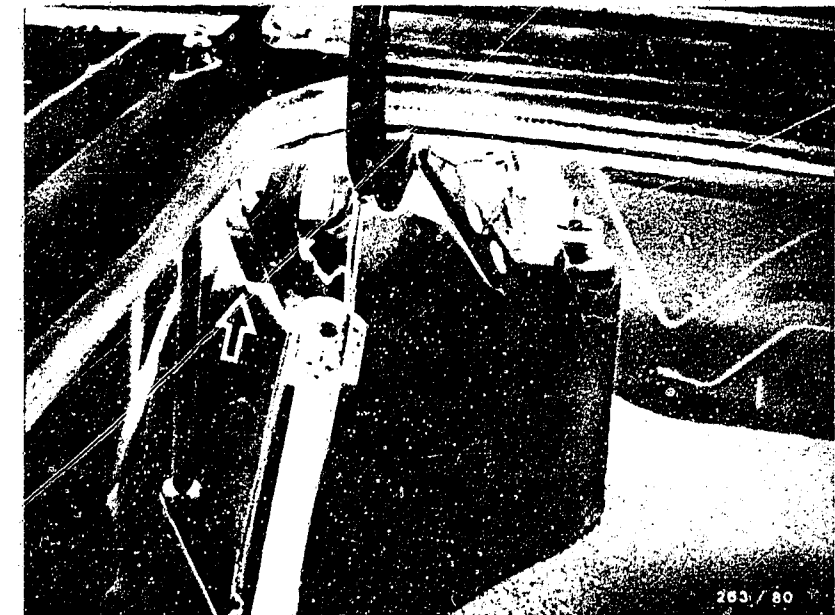
- Lead from wiring-harness plug pin 25 to stop-lamp switch
- Lead from wiring-harness plug pin 25 to bulb monitoring unit term. 54 (stop, tail, license-plate lamps).

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in leads.

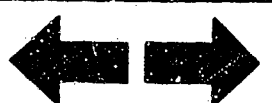
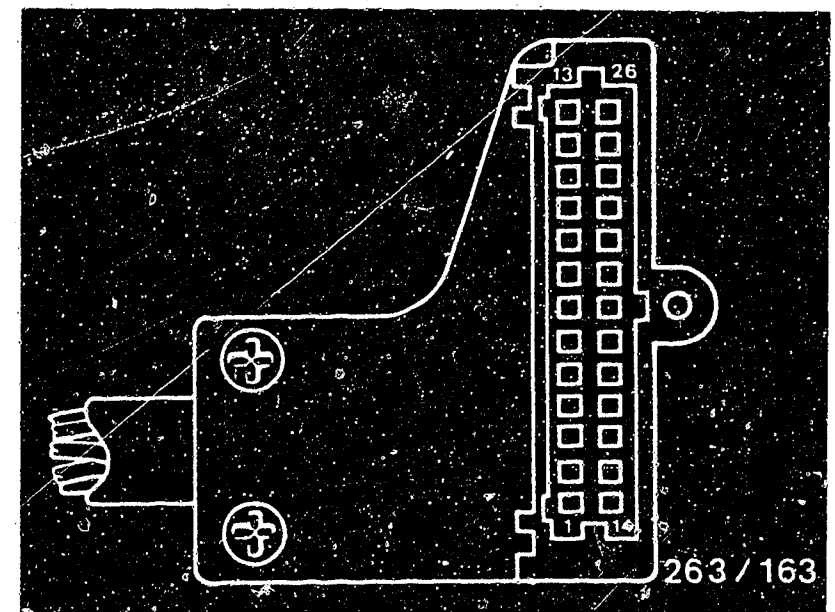
Bulb monitoring unit or stop-lamp switch defective.

Replace defective parts.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug



## Test step 22:

### Operation:

Program switch position 22

### Test subject:

Lead from wiring-harness plug pin 26 to bulb monitoring unit term. KKL

### Measuring equipment:

Test adapter KDVM 7601  
Multimeter

### Measuring range:

0 ... 50  $\Omega$

### Operation in vehicle:

Side-marker lamps switched on

### Additional operation:

### Test equipment reading:

< 20  $\Omega$

Is test specification reached?

no

### Malfunction:

Resistance > 20  $\Omega$

### Testing with multimeter

Ignition lock position "0".  
Side-marker lamps switched off.  
Test adapter KDVM 7601  
disconnected from vehicle  
wiring harness.

Check following lead using ohmmeter.

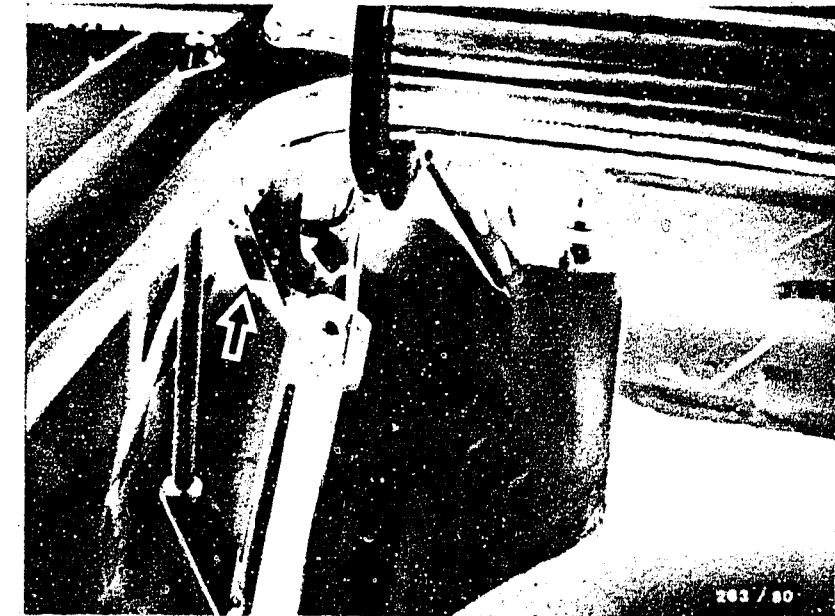
- Lead from wiring-harness plug pin 26 to  
bulb monitoring unit term. KKL

Nominal resistance: approx. 0  $\Omega$

Eliminate contact resistances / open circuits in  
lead.

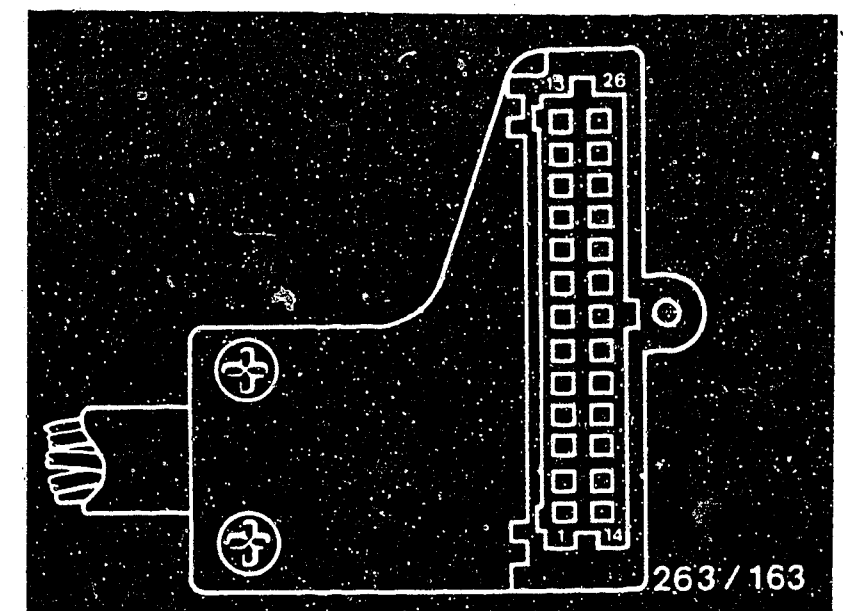
Bulb monitoring unit or one of the license-plate  
bulbs defective.

Replace defective parts.



Lamp indicator unit for stop/reversing/license-plate lamp is located in trunk on 3 Series: on left above wheel arch (arrow)  
5 Series: behind back-wall trim in direction of travel, left next to centre strut (not illustrated)

Wiring-harness plug





## Contents

### Section

### Coordinates

Structure of the microcard.....	A	1
1. Rapid test of display unit.....	A	2
2. Rapid diagnosis chart for active check control unit with test specifications.....	A	3
3. Electrical terminal diagram.....	A	10
4. Test equipment.....	A	12
4.1 Test adapter.....	A	12
5. Installation position of components.....	A	13
6. Trouble-shooting according to customer complaints.....	B	1
7. Rapid testing of display unit.....	B	3
8. Trouble-shooting program.....	B	4





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Automotive Equipment - After-Sales Service  
Department for Technical Publications KH/VDT,  
Postfach 50, D-7000 Stuttgart 1

Published by: After-Sales Service Department for  
Training and Technology (KH/VSK). Press date: 4.1989  
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Microfilmed in the Federal Republic of Germany. Micro-  
photographié en République Fédérale d'Allemagne.

